THE BUILDER

VOL. XCVII.—No. 3486. NOVEMBER 27, 1909.

Contents.

	PAGE
On the Value of Westminster Abbey	573
Surveyors, Auctioneers, Estate Agents, and the Budget	575
Notes	575
Preston Corporation Secondary School	577
The Architectural Association	578
An Early American Concrete Bridge	582
The Architectural Association: Visit to Orient Line S.S. "Orvieto"	583
The National Trust	583
London Master Builders' Association	583
The Avery Architectural Library, Columbia University, U.S.A.	583
National Welsh War Memorial, Cardiff	584
Architectural Societies	584
Archæological Societies	585
Engineering Societies	585
Metropolitan Asylums Board	585
Meetings	586
Fifty Years Ago	586
Illustrations:—	
South Transept, Westminster Abbey	586
The Surveyors' Institution	586
St. Margaret's Hospital, Wimborne	589
The London County Council	589
Applications under the London Building Acts, 1894 to 1909	590
The Institute of Sanitary Engineers	590
Legal Column	591
Competition News	593
Books Received	593
Correspondence:—	
Mr. Norman Shaw's Soil-pipe System	593
The Disconnecting Trap	593
Builders Taking Out Their Own Quantities	593
The Areameter	593
London County Council Education Committee	594
The Tribunal of Appeal	594
Court of Common Council	595
Projected New Buildings in the Provinces	595
London and District Borough Councils	595
General Building News	596
Sanitary and Engineering News	596
Miscellaneous	597
Capital and Labour	598
Law Reports:—	
Action by a Builder	598
Patents	598
List of Competitions, Contracts, etc., Open	599
Some Recent Sales	602
Prices Current	602
Tenders	603

Illustrations.

The South Transept, Westminster Abbey. From Drawings by Mr. C. A. Bassett-Smith.

1. The Interior End Elevation.
2. Plans of the same at different stages.
3. Mouldings and Decorative Details.

Illustrations in Text.

	PAGE
An Early American Concrete Bridge	582
Sculpture from the Welsh National War Memorial. Mr. Albert Toft, Sculptor	584
The Surveyors' Institution: "Town Planning Systems":—	
Evelyn's and Wren's Plans	587
St. Margaret's Hospital, Wimborne	589
The Areameter	593

On the Value of Westminster Abbey.

IT is well now and then to have our thoughts directed to a fresh consideration of some great architectural monument which has been familiar to us all our days, and which becomes from that very cause almost too well known and too generally accepted for its real greatness to strike us as it would if we came to it as a monument seen for the first time. This is somewhat the case with Westminster Abbey. Partly because of this familiarity; partly because the exterior has unavoidably been a great deal restored; partly because the western façade is somewhat weak and completed with towers which are not in harmony with its style, and the north transept a work of modern Gothic (though very fine as such)—for these combined reasons we are apt to feel less enthusiastic about it than about such cathedrals as Peterborough, Lincoln, Durham, and Salisbury, all of them more homogeneous and striking in their exterior architecture than Westminster, besides having, in three out of the four cases at least, peculiar effectiveness in regard to site—Durham and Lincoln seated on the crests of hills; Salisbury rising from that expanse of level lawn which gives such effect by contrast to its aspiring lines. The magic of Westminster lies more in its interior than its exterior; it is after wandering about that in some hour of leisure, tracing out its history and comparing its multifarious features with each other, that we seem to realise afresh what a wonderful building this is which we habitually call "the Abbey," and which we are apt to forget somewhat from the very fact of the familiarity of its name and presence.

It seems to have been with something of this feeling—the desire to recall to mind the great and endless interest of Westminster Abbey both in the architectural and the historical sense, that Mr. Bond has produced his book, the latest addition to the somewhat extensive literature connected with the subject.* This is neither a purely architectural study nor a historical essay; it partakes of the nature of both; and though the author is not an architect, he has sufficient knowledge of architectural structure to treat that portion of the subject in a satisfactory manner; though he knows more about Gothic than he does about Classic architecture, or he would not have made a contemptuous reference to the Parthenon (as contrasted with a Gothic cathedral) as having windowless walls "and a hole in the roof to admit light, or a roof that was all hole." The "hypæthral" notion of the Greek temple is entirely exploded now, and it is all but certain that it was lighted from the doorway.

In the first place, after giving what history is available in regard to the first abbey at Westminster, that of Edward the Confessor (or perhaps we should rather say the second, as there was certainly a Saxon church before it), the author takes a very interesting and rather new line in his endeavour, in connexion with sketch plans of the church at three different dates, to enable the reader to realise to some extent what was the actual practical use of the church and the meaning of some of the details of its plan. For there are various peculiarities in the plan of Westminster. In the first place, the principal or most important entrance, architecturally, is not, as usual, at the west end, but in the north transept, where was placed the triple porch with deep recesses which is so usual a feature in the west front of French cathedrals, but which is here placed in the transept, while the west front has (most unusually) only one not very important portal. The explanation probably is that the portals of the south transept would be on the side nearest the royal palace, and thus formed a kind of state entrance to the church, easily accessible. A curious point is also that while the most eastern of the three portals has no actual doorway, a line of chapels being behind it, there is nevertheless a doorway into this chapel or leading through it, round the angle of the transept, on its eastern side; a doorway now unused and seldom noticed. To know the meaning of this door we should have to restore the plan of the conventual buildings at the time the church was built; the author does not suggest the use of the door in this unusual position, but he calls attention to its existence, which is often overlooked and is not even shown on most plans of the church. Another very unusual feature in the plan of Westminster is that although there are two aisles to the north transept, in the south transept the site of what should have been the western aisle is occupied by part of the east walk of the cloister, proving that the Norman cloister existed when the transept was built, and it was not desired to disturb its plan. It is also singular, as the author observes, that in the eastern aisle of the same transept there are no chapels, which is a position in which one would naturally have expected to find them, especially as they occur in the eastern aisle of the north transept. On the other hand, to remark on the absence of altars in the western aisle of the latter transept is rather superfluous; they would not be likely to be found in that position. The small doorway on the north side of the nave (fifth bay from the crossing) is probably connected with the extensive sacristy,

* *Westminster Abbey.* By Francis Bond. Pp. 318. London; Henry Frowde; 1909. 10s.

long since destroyed, which Henry III. is known to have caused to be erected adjoining the north side of the nave.

The author analyses the requirements of the plan in three chapters, headed respectively "Planning for the Monks," "Planning for Pilgrims," and "Planning for Royalty." In the first he has endeavoured to realise the order of service and of processions on great occasions, and to show how various features in the plan were either intended for, or fell into the scheme of, the ritual observances of the monks. Planning for pilgrims is not suggested to have been more than providing grilles and gates to keep them from doing mischief or going where they were not wanted. As "to planning for royalty," the most interesting point suggested in that connexion is the reason for there being no chapels in the east aisle of the south transept, viz.: that it was part of the royal processional route; the author's theory being that on the occasion of great functions the royal procession would enter through the north transept door, proceed down the north aisle of the nave as far as the sacristy door; turn to the left and enter the choir through the choir screen, up to the raised seat in the sanctuary, and after service would proceed through the east aisle of the south transept to the door in what is now known as Poets' corner. The theory serves at least to explain the absence of chapels, and to give a practical turn to the planning. On the other hand, we do not see that the present chapter-house necessarily arose, as the author suggests, from the encroachment of the new south transept on the Norman chapter-house. The southern wall of the transept would have about coincided with the northern wall of the chapter-house. But the desire was to have a more spacious and more architecturally effective chapter-house, and the quadrangular plan of chapter-house was, moreover, manifestly going out of fashion.

In the chapter on "Principles of Design" the author perhaps finds out a little too much, especially in undertaking to show that 511 ft. was just the right length for the church, and that the side-aisles were narrower than the centre because they were only for passage. For that purpose a much narrower aisle would suffice, as we see in many modern churches where the aisles are reduced to mere passages. The three-aisled arrangement, and the proportion of side-aisles to centre space, are not so much the result of any practical intent, as the conformity to long precedent, descending from the days of the basilica. The reason given for the comparatively close spacing of the piers at Westminster—that they followed the position of the previous Norman piers, is very likely the right one. The chapter is hardly one for architects, but in a book manifestly designed for the general reader it is a useful one, as at all events suggesting to them that there is reason in architectural design, and that it is not mere chance, although precedent has more to do with it than the author seems disposed to recognise. The analysis of the French and English element at Westminster is well carried out, and we agree with it in the main, except that we cannot regard the two capitals given on page 107 as manifestly French work; the left-hand one is completely French in manner, but the right-hand one, with the naturalistic foliage, is much more like English work, and recalls the Southwell carving. That "the church was planned and designed by an architect practising in France," though not proved, is at least probable. It has far more of the French element in it than any other English cathedral.

The author's remarks as to the intended arrangement of Henry VII.'s chapel by its founder, and the present arrangement due to Henry VIII. or his artists, are of some interest. A rough plan is given showing his idea of the originally intended arrangement. We may quote part of the description, which is stated to be based on the Will of Henry VII.; but if so, it might have been better to quote the precise wording of the will:—

> "It was to contain a chapel of Our Saviour, or, as he calls it in an indenture with Abbot Islip, 'a closure of metall in maner of a Chapell'—*i.e.*, a chantry chapel constructed of bronze, but designed with buttresses, window tracery, pinnacles, etc., just as if it were of stone. At its east end was to be the altar of Our Saviour; its position may still be identified by the blank space where the running inscription inside the grille stops, and by the presence of a beam above to give support to a tester. Between the altar and the tomb room was left for the chantry priests to stand. The western part of the enclosure was to be occupied by the tomb below which Henry was to be buried, and to which the body of his Queen, Elizabeth of York, was to be transferred. This bronze chantry chapel, he says in his will, was to stand in the centre of the stalls. And it was because the bronze 'closure' is so broad, that Vertue had to make his nave broad, and the stalls narrow. . . . Sufficient space had to be left between the stalls and the grille to allow those in the stalls an uninterrupted view on either side of the grille on to the altar of Our Lady. As for this altar, so that it might be well seen from the stalls, it was to be placed much further east than it is now. Finally, there was the site to be allotted to Henry VI. The precedent of St. Edward's chapel was followed, where the shrine of the Confessor is placed at the back of the altar of St. Peter, but at some distance from it. So here Henry VI.'s tomb was intended to be placed east of the altar of Our Lady, and quite clear of it. . . . As one sat in the lofty stalls, one would have seen in front the magnificent bronze chapel of Our Saviour, which would have occupied so much of the nave that the latter would no longer have seemed unduly broad; then well to the east the altar of Our Lady, with a reredos probably kept low; then, towering up and behind it, the lofty chantry chapel of Henry VI., with his tomb below."

Henry VIII. is credited (or discredited) with having altered all this, and certainly Mr. Bond's description gives one the idea of a much finer climax than now exists in the chapel, and everyone must regret the insertion of the classical altar at the western end of the grille; the one thing there which is out of keeping with the rest. As to the chapel itself, taken as a whole, we hold that it is one of the most wonderful achievements of art that the world can show. A whole cathedral carried out in the same style would of course be wanting in breadth and grandeur; but the chapel must be regarded as what it was meant for—a kind of shrine, on which the greatest richness of detail was to be expended. We doubt if it is thought half enough of by Londoners. There is nothing in Paris to equal it; and we have had the judgment of a French critic to the same effect.

We are very much in sympathy with Mr. Bond's remarks, in Chapter XVII. and elsewhere, on what he calls "the mainspring of Gothic architecture," at all events as shown in such a building as this; the desire to produce something great and glorious, entirely independent of its mere practical use. As the author says on another page, "when we see a large modern church we know that it has been built for a large congregation; if we see a small one, we know that it is for a small congregation." But there was no such play of cause and effect when churches like Westminster Abbey were built. They were not suited to the size of congregations; they were made glorious for their own sake. "Let us," says Mr. Bond, "who are heirs to its glories, cease to regard and treat the Abbey as a public cemetery and sculpture gallery." We may cease to regard it as such, but the "treatment" of it as such has been done for us already. That the church is very much spoiled by the mass of often vulgar and incongruous monuments crowded into it, is pitiably true; but we cannot remove them now; they are part of history, both private and public. They were placed there at a time when people had no understanding of the beauty, either spiritual or artistic, of mediæval architecture, and thought their own monuments of much more importance. One can imagine how astonished Nelson would have been had anyone told him, when he uttered his memorable aspiration for "A Peerage or Westminster Abbey," that his monument might be an injury to the architectural effect of the Abbey. He could probably hardly have even understood the point of such an objection. Some of the author's remarks on the monuments, however, are open to question. He scoffs at the statue to Watt as that of a man "who made some improvements in the steam-engine." Watt invented the steam-engine, which is a large enough achievement for a monument, though we admit that the colossal figure is a hulking lump of a thing, and one is glad it is not in a prominent position. To call the Nightingale monument "the most abominable thing in the Abbey" is an exaggeration; it is too sensational, but it is the work of a sculptor of genius, which cannot be said of many of the monuments. We should have thought the small monument to Major André, with its refined architectural design (by Robert Adam) and well executed small figure subject in relief, was worth recognition; and Mr. Gilbert's monument to Fawcett, with its row of little symbolical figures beneath the portrait medallion, one of the most beautiful and poetic of modern monuments, deserved something more than casual mention as "a bronze to Fawcett." Few visitors know of this beautiful work, and its artistic value ought to have been pointed out. And in speaking of the south cloister walk, mention might have been made of the neatly-cut gravestone in the cloister walk (also known to few) to the memory of Clementi, the distinguished musician whose curious fate it was to be born in Italy, to make his fame in Germany, to spend the latter years of an honoured life in London, and to be buried in the precinct of an English cathedral.

In the present issue we give, as our lithographic plates, a very fine set of

measured drawings of the south wall of the south transept, by Mr. C. A. Bassett-Smith, which were purposely selected to appear in the same issue as this article, and form an illustration of its subject.

We observe that in the preface the author quotes the remark of Sir Lucius O'Trigger in "The Rivals"—"there's very snug lying in the Abbey," as a proof that the great church was then, as now, familiarly spoken of as "the Abbey." This is a mistake, though a very common one. The scene of "The Rivals" is laid in Bath, and the Abbey which Sir Lucius proposed as a place of interment for his friend was, of course, Bath Abbey church, not the more historic building at Westminster.

SURVEYORS, AUCTIONEERS, ESTATE AGENTS, AND THE BUDGET.

THE mass meeting of surveyors, auctioneers, and estate agents, held at the Cannon-street Hotel last week, came at a very opportune time. The public still have a very imperfect idea of what the land clauses in the Finance Bill involve, and the unanimous testimony of such a body of men as were assembled at that meeting should surely carry considerable weight. It was not a meeting of landowners, or of persons necessarily holding security on the land, neither was it a political gathering; on the contrary, it was a non-political meeting of those professional classes who, if the Finance Bill was carried, would derive direct benefit from the vast increase of work which would be placed in their hands. If all the land has to be valued, every private individual would require professional advice; and, as was pointed out at this meeting, the Bill has been described as "an Auctioneers' and Surveyors' Endowment Bill."

What is the testimony of these men who certainly have personally nothing to fear from the Bill, and indeed who might be expected to have a prejudice in its favour? They testify that its effects will be disastrous to the nation, that it is destructive of all confidence in what has hitherto been the premier security for investment; that the development of land for building will be seriously interfered with and to a great extent stopped, and that capital will be driven out of the country. But this is not all. These gentlemen embrace those most qualified to express an opinion on the feasibility of the valuations proposed; and they declare the proposals to be ill-conceived, unworkable, and often unintelligible; that the valuation of site values as is proposed apart from buildings would be purely theoretical; and that an enormous expenditure would be involved.

The Finance Bill has been put forward as having a principle involved in it beyond the mere raising of money; its authors assert that it will stimulate building development. It may then well be asked—Why has its shadow, only, caused such protest from another class who should, if that contention be true, have much to gain from it—the builders? And why has it paralysed the building trade? It was stated at the meeting that the accounts supplied by more than 1,000 builders showed a reduction of from 35 to 40 per cent. in the wage bills, and we have drawn attention week by week to the protests raised by the building trade from all parts of the country. It is to be hoped that such a body of testimony from those classes who speak without prejudice against the Bill, and who are supposed to be those most likely to benefit by its provisions, will carry more weight than the assurances of politicians who have no practical knowledge, and whose party interests are seriously involved in the measure. If the builders are not benefited by the measure, what becomes of the Government's assurances that development will be stimulated?

NOTES.

Contractors and Quantities. IN reference to our article of a fortnight since (page 513 *ante*) on "Architects' Charges and Builders' Quantities," we find that some of our friends the builders object to our having referred to the subject of the non-supply of quantities as having been "discussed with some bitterness." In reading a report of proceedings one may get a different impression from the written words from what one would have got from hearing the speeches; the stress apparently laid on the word "hardship" gave the impression that there was a tone of complaint in the discussion; we are assured, however, that this was not so (or not so intended), and that the Master Builders' Association were desirous of putting their side of the case before the architects in the most friendly and conciliatory spirit. In remarking that there could really be no hardship in a builder taking out his own quantities, seeing that he could add something to his estimate to cover it, of course we were referring to single tenders, not to competition tendering, in which case only the successful tenderer could get any return for his quantities, and probably would not, as he would have to tender low to insure success. Equally of course, ten persons taking out the quantities for the same building (from duplicated drawings) would be a waste of labour. What we wished to point out was that the quantities are, after all, essentially and originally the contractor's business and not the architect's or his client's; that the present position is an artificial one brought about by the system of competition tendering. We have reason to believe that many builders would be only too glad that competition tendering should be wholly or partially abandoned, and a fair estimate asked for from one builder, to be accepted or not on the judgment of the architect; and such a custom would be far better for good architecture and good building. If wealthy corporations or individuals could only bring themselves to consider, when proposing an important building, not, "How can we get it done *cheapest?*" but "How can we get it done *best?*" the result would be better, in the long return, for all concerned—architect, builder, and building owner. Never in the history of architecture has cheap building been worth much.

Profitable Forestry. EVERY department of German industry is notable for the thorough manner in which scientific knowledge has been applied. Forestry is no exception, and the results attained have been remarkably satisfactory. Of the 35 million acres of forest land in the Empire, about half belong to the State and public authorities, the bulk of the remainder being owned by private individuals. The practical value of systematic forestry is well shown by the returns for Government forests in Saxony, where the expenditure is about 8s. per acre, and the net revenue 21s. per acre. It is interesting to compare these figures with statistics quoted in a United States Bulletin, concerning the national forests, where it is stated that in 1905-6 the expenditure was ·33d. per acre, and the net revenue a deficit of ·005d. per acre; while for 1906-7 the expenditure of ·43d. per acre resulted in the net revenue of ·04d. per acre. In Wurtemburg the net revenue averages 24s. per acre, and even more profitable returns are secured in several smaller States. Austria, Hungary, Italy, and Switzerland have also reason for regarding outlay on tree cultivation as an excellent investment, and we trust that in due time similar experience may be furnished by the United Kingdom.

Trades for Boys and Girls in London. THE Education Committee of the London County Council have made an interesting report on what it terms "apprenticeship"—that is to say in general words the training for trade purposes of those who have just left school. At present the situation is not as satisfactory as it should be, but one must remember that Rome was not built in a day. From the returns it is proved that little more than a third of the children when they leave an elementary school enter on a skilled occupation. The truth is that even after recent changes the opportunities for skilled education by those who have immediately left elementary schools are still insufficient. The so-called "half-time classes" also are naturally unpopular with employers, and many parents prefer that a boy on leaving school should at once earn some wages, however small, in an unskilled capacity, thereby handicapping his future, rather than that he should obtain technical education with a certainty of higher pay in years to come, and in the meantime be on his parents' hands. The problem is one of much difficulty, and it is chiefly by impressing on parents and pupils the advantages of a proper technical education that improvement can be made.

Smokeless Fuels. THOSE who are not satisfied with gas as a fuel need not now resort to smoke-producing coal, for several forms of solid smokeless fuel are being offered this year to householders. All who are in sympathy with the smoke abatement movement should give one or other of these a fair trial. The latest smokeless fuel is called "charco," and consists of coke which is almost free from water. Ordinary coke is withdrawn from gas-retorts in a red-hot condition and is extinguished with the aid of water. "Charco" is coke which has been

extinguished by being smothered with dry coke breeze, and then separated from the breeze. When burned in an open grate it burns more readily and more cheerfully than wet coke. One of the chief objections to ordinary coke as a household fuel is the fact that it often contains over 10 per cent. of water; and the presence of this water makes it difficult to maintain a cheerful fire, and causes the coke to make an objectionable crackling noise while it is being heated. Another new fuel is called "coalexld," and this consists of coke produced by treating the coal in the retorts with certain chemicals. "Coalite" and "carbo" are forms of smokeless fuel which have been in use for some time. They are produced by carbonising coal less completely than is usual when the manufacture of gas is the principal object of carbonisation. These two latter fuels may be regarded as soft coke, and they burn with more flame and make a more cheerful fire than ordinary gas coke. Most of the coke sold by gas companies is used for industrial purposes, but probably more would be used as household fuel if the gas companies would sell broken coke guaranteed to contain less than 2 per cent. of water.

Portland Stone. WE have received from Mr. F. J. Barnes a paper read to the Incorporated Clerks of Works Association on "Portland Stone," with special reference to the variety which outcrops on the top of Portland. Although strata belonging to the Portlandian series appear along a large part of the Dorset coast and run inland through Somerset, Gloucester, Buckingham, Huntingdon, and finally disappear on the east coast of Yorkshire, none of them yield building stone possessing the same value as that quarried on the Isle of Portland. The author states that even the Portland stone found on the coast of Dorset only three or four miles from Portland itself, and being in every other respect identical, is an unmarketable commodity. A considerable part of the paper is devoted to an explanation of this somewhat curious fact. Mr. Barnes attributes the superiority of the local product to the silicious kernel forming the nucleus of the oolitic granules cemented together by carbonate of lime. Hence, he argues, if the calcareous envelope becomes split the insoluble core remains unaffected and the durability of the stone is not destroyed, as happens in the case of stone consisting of earthy materials readily disintegrated by exposure to the air. There is a good deal of interesting matter in this paper concerning the origin of Portland stone; relics of Roman, Saxon, and Danish occupation; and some ancient institutions still attached to the Royal manor of Portland.

Measuring Slating and Tiling. WE have received a complaint from a builder as to a circular of new rules for measuring up slaters and tilers' work (codified by the principal master slaters and tilers) to the effect that no notice has been given of these rules, the immediate application of which would considerably prejudice builders in regard to work at present in hand. We can hardly think it competent for two parties to enter into an agreement where a third party (in this case the builder) is concerned, without reference to that third party. Under any circumstances, in our opinion any contract entered into on the terms obtainable before the issue of the notice and circular referred to, would stand, and we greatly doubt whether it would be possible to enforce the system now proposed on the ground of "trade usage," without a considerable length of time being allowed to elapse for the completion of existing contracts. We cannot agree with the statement in the covering letter of the Hon. Secretary of the Special Committee that "with but small exceptions the two lists merely codify the measurements which have for many years past been customarily taken for all work in the south of England," and we can conceive cases where the system now proposed would make a considerable addition to the cost.

Coke Breeze Concrete. SOME recently-published tests by Mr. T. M. Lewis, Engineer to an American Coal and Coke Company, bear upon the compressive strength of coke concrete. The breeze used was made up in the form of columns, 30 in. long by 8 in. diameter, which were tested in a Riehle machine at Cornell University. The average breaking loads per square inch for different mixtures of concrete were as follows:—(1 : 2 : 3) 339·8 lb.; (1 : 2 : 4) 350·4 lb.; (1 : 2½ : 5) 315·3 lb.; (1 : 3 : 6) 237·5 lb. Mr. Lewis quotes for comparison the subjoined average results obtained by Professor McCausland with stone concrete:—(1 : 2 : 3) 374 lb.; (1 : 2 : 5) 296 lb.; (1 : 3 : 5) 301 lb. Of course, it is always unsatisfactory to compare tests of concrete made at different places and under different conditions, but the figures quoted show that coke concrete possesses considerable resistance to compression if carefully mixed and handled. The author admits that iron and steel corrode very rapidly when in contact with wet coke, and the consequent danger of that material as a constituent of reinforced concrete, two points which we hope will not be forgotten by architects and builders.

The Illuminating Engineering Society. THE inaugural meeting of the first session of the Illuminating Engineering Society was held in the hall of the Royal Society of Arts on the 18th inst. This Society has been founded with the object of investigating the various problems connected with the adaptation of light to the uses of man. It is hoped that many architects and surveyors will join the Society. Professor Silvanus P. Thompson, in his presidential address to the meeting, suggested that the Society should appoint a committee to draw up a lighting specification for the guidance of architects. We do not think that any such specification can be more than a rough general guide, for every building requires different treatment, and there will never be any general agreement as to what is the best artificial illuminant or what is the most suitable intensity of light for the use of the human eye. Nevertheless, the work of the Society should be watched and supported by all who are concerned with street lighting or the provision of artificial light in buildings.

Electric Lighting. THE paper on "The Present Aspect of Electric Lighting" which was read this week by Messrs. Handcock and Dykes to the Institution of Electrical Engineers is both useful and timely. They point out that the general use of metallic filament lamps has had the effect of diminishing the total receipts of most of the electric supply companies, although as a rule they have had to increase their lamp connexions. The average consumer, although the candle-power of his lamps has been increased, now pays much less to the company. In particular in those cases where "free wiring" has been adopted and the consumer pays for it by a small percentage on his meter bills the loss to the company has been serious. The authors therefore think that some remedy must be found if the electric-lighting industry is to be placed on a proper commercial basis. They suggest that this can be done by introducing a proper method of charging for the electric light. At present the consumer wants light, but is charged for electric current. They propose to charge the consumer a fixed sum per lamp per annum, quite irrespective of the number of hours it is used. This would avoid the necessity of meters and save a great deal of clerical work at the station. The objection may be raised that without the restriction of the meter bill the consumer will waste the commodity. As the authors point out, however, if this objection were valid the present system of water supply in London would be an impossibility. In the electric-lighting case the consumer who was always writing for lamp renewals would naturally be suspected of wasting current, and could be dealt with specially. Special lampholders would have to be used so that the 25-candle-power lamp supplied by the company could not be replaced by, for example, a 100-candle-power lamp. A method somewhat similar to this has been introduced at Harrogate, where small consumers are charged a fixed sum of 11s. per lamp per annum. If the light is only required from dusk to dawn, or during "periods of unusual darkness," the charges per lamp can be appreciably reduced. One great advantage of the author's method is that any improvement in the efficiency of the lamp will be of benefit to the supply company, and not, as at present, a loss to them. We think that this system will be of special use in extending the use of the electric light in small cottages in outlying districts.

Mulberry-street Viaduct, Harrisburg. BUILT to replace a steel bridge injured by fire several years ago, the reinforced concrete viaduct at Harrisburg comprises arches of various spans ranging from 40 ft. to 100 ft. carried on concrete piers. The viaduct proper is 1,800 ft. long by 44 ft. wide between parapets, the total length including an inclined approach being 2,400ft. This is the longest reinforced concrete bridge hitherto built, and with the exception of the Pont d'Esprit, near Lyons, commenced in A.D. 1265, it is the longest arched highway bridge

standing to-day. The magnitude of the work will be brought home to our readers by the statement that the Mulberry-street Viaduct is twice as long and exactly the same width as Westminster Bridge, another point worthy of note being that its cost was little more than one-eighth that of the latter structure. While a few people in this country profess lack of confidence in reinforced concrete as a trustworthy material for bridge building, American engineers are busy in the construction of monumental bridges and viaducts in that combination, which has in reality long since passed through the experimental stage. The Mulberry-street Viaduct was designed by Mr. James H. Fuertes, Consulting Engineer to the Harrisburg Board of Public Works.

City Planning in Pittsburg.

AN important body recently formed in Pittsburg, is the Civic Commission consisting of sixteen members, with an advisory board of engineers. City planning is one of the subjects engaging the attention of the Commission, with the object of enabling the community to regulate the growth of the industrial district on satisfactory lines. Closely associated with the question are those of railway extensions, main thoroughfares, and street railway operation, all of these reacting upon the design of new districts. The planning of local streets, the acquisition of land for parks and other open spaces, a study of the flood problem, water supply and drainage requirements, and the control of private building estates, are among other matters about to be investigated. Finally the Commission are inquiring into the financial, legal, and political situation affecting the provision of funds for improvement works. So far as we can judge, the municipal authorities appear to have set themselves a very big task, something like that awaiting our own long-expected Traffic Commission, with the duties of City planning thrown in. American cities are fortunate in being able to take action with regard to various important local matters, instead of having to wait for authority from an over-burdened Legislature, as happens in this country.

De La Hay-street, Westminster.

THE sale of the fittings and appointments, and they are of a highly ornamental and costly kind, of six houses in this street is a prelude to the demolition of the property for the erection of Government offices. The houses, now numbered 11, 13, 17, 19, 21, and 23, stand on the west or park, side; see the plan in our issue of October 3, 1896. No. 19 was built after W. Butterfield's designs; Nos. 13 and 17, by Messrs. Isaacs & Florence, have replaced Nos. 13, 15, 17, and the fine shell canopy over the doorway of (old) No. 17 was preserved and refixed (painted in white) in the new building. This, the northern, portion of the street was formerly styled Duke-street, in which stood the State Paper Office, built in 1829-33, after designs by Soane, and pulled down in 1862 to make room for Scott's India and Foreign Offices. The street was a fashionable quarter in its day; in his "New View of London," 1708 Hatton describes it as being "a spacious and pleasant street between St. James's Park, north, and Long Ditch, south, mostly, especially the west side, inhabited by persons of quality." Bishop Stillingfleet, Archbishop Hutton, Pope, and Dr. Arnold, the composer, lived there; and Matthew Prior in a house opposite Charles-street. On the north side of Chapel-place, No. 2, St. James's-lodge, occupies the site of Duke-street Chapel, converted in 1769, *teste* Timbs, out of the justice-hall of Lord Chancellor Jeffereys's house (on the site of Nos. 7, 9, and 11, and pulled down in October, 1892), to which he added the two wings, with the range of steps, giving access into the park. The addition of the steps was a great privilege conceded by James II.; one of the two flights yet remains.

Vandalism and Anti-Vandalism.

WE regret to learn from statements in the daily papers, that all the efforts and representations that have been made to avert the destruction of Bath-street have been of no avail, and the demolition of the houses has been commenced. It is to be feared that is only a first step in the destruction of the unique character of Bath as a city; for an example of this kind is seldom without imitators. On the other hand, it is satisfactory to find that the Whitgift Hospital at Croydon has at all events been saved for the present. At a special meeting of the Croydon Borough Council on Monday, to consider the promotion of a Bill for powers to widen North End by removing the hospital, letters against the proposal were read from various archæological societies, and Mr. Pelton pointed out that the Royal Commission had virtually scheduled Whitgift Hospital as worthy of preservation, and that no Parliamentary Committee would sanction its destruction. In spite of this, twenty-five local representatives were willing to destroy the only building of historic interest in Croydon for the sake of widening a short piece of street. Fortunately twenty-nine righteous were found to vote against them, and so this stupid scheme of demolition has been stopped for the present.

PRESTON CORPORATION SECONDARY SCHOOL.

THE Corporation of Preston has held an open competition for a secondary school to be called "Preston Grammar School," and to be situated in a fine position overlooking the park. The site is an elongated one, 650 ft. by 108 ft., and the principal frontage, in which was to be placed the main entrance, faces across the park due north. The school is to accommodate 250 boys and to be in every way a complete and fully-equipped secondary school with a junior section, which was to be "planned so as to form an integral part of the school, and yet allow (if necessary) of different times of assembly, dismissal, and recreation without undue interference with the rest of the school."

The Corporation, while "desiring to study economy," suggest that stone should be freely used on the principal façade, and express a wish for a dignified design expressing the character of the building and its plan.

As regards the general plan of the school, a large assembly hall was to be provided of sufficient size to accommodate all the pupils, and corridors were to be avoided as much as possible—where used they were to be short, well lighted, and of sufficient width to allow space for exhibition, designs, models, etc. This requirement, together with the enumeration of rooms wanted, without any special stipulation about isolation of manual instruction room or gymnasium, practically formed the basis upon which the plan was to be built up. The chemical laboratory was to be placed on the first floor, but the physical laboratory to be left to the discretion of the architect. It will be seen, therefore, that the conditions were left in a very general state, leaving room for a considerable variety of treatment. Out of the 170 designs submitted, however, there was one type of plan which seemed to emerge as the general solution of the problem. The plan was symmetrical and consisted of a long, almost unbroken frontage to the south, along which were placed the classrooms; to the north of this range came a corridor which merged in the centre of the plan into the assembly hall; the latter, forming a large projection to the north, had a one-story block in front forming the main entrance and administration portion, with specialising rooms grouped to the east and west of it. It almost invariably followed in this typical scheme that the south, or less important, elevation was considerably more satisfactory than the north elevation to the park, which was broken by the different heights of hall and side wings and the various projections. There were quite half a dozen excellent plans submitted on these lines, any of which would have made a first-rate working school.

The assessor, Mr. Catterall, of Preston, has placed the designs submitted by Messrs. Woolfall & Eccles (of Liverpool) first, Mr. Greenwood (of Manchester) second, and Messrs. Packer, Drewitt, & Drewitt (of Southport) third.

Messrs. Woolfall & Eccles's plan is not on the lines of the typical plan already described, and we feel that it is largely the external appearance which has attracted the assessor. We may say at once that of its kind it is exceedingly well done. It is a heavy mullioned, battlemented Tudor design, recalling some of the old grammar schools found in the south of England—at Wimborne, in Dorset, for example. The plan to suit this Tudor style is distinctly irregular. The main entrance on the north front is to one side in a low gate-tower with a lofty oriel window over it; this feature is roughly balanced on the other side by a tall bell turret with a leaded cupola; between come the many transomed windows of the hall, which is lit to the ground, with a large bay in the middle recalling the dais bay window of the old mediæval hall; lower irregular buildings on either side of the towers complete the group. To the right of the main block is a long line of low buildings which cut the playgrounds longitudinally into two halves; this wing, which has a covered way on either side, includes first a closed-in court, then a vast bicycle shed (kept so large because in the future it is to carry over it the two additional classrooms), next the latrines, and finally the manual instruction room with the gymnasium over. In the main block corridors have been freely indulged in, in spite of the conditions. Not only is the assembly hall inclosed on three sides with insufficiently lighted corridors, but the two covered ways are continued through the main building to meet one of the cross corridors forming the separate approaches to the assembly hall for senior and junior boys. In fact, the whole plan reflects the mediæval character of the fronts; it is picturesque and interesting, but hardly that of a modern school. The lighting of the classrooms, for instance, appears to us inadequate, the jamb of the windows being 4 ft. 6 in. from the interior angle of the wall. The actual position of the various departments—the isolation of the juniors, the position of the chemical laboratory, etc.—is good, but then this extravagant multiplication of corridors greatly assists such separation and grouping; the problem was to do it with the minimum of corridor and the best lighting. The playroom, which

was to be placed in the basement and was to be the size of an ordinary classroom, is shown in the winning scheme 74 ft. by 30 ft., the size of the assembly hall. Of course there is no objection to a large playroom, except the "desire to study economy as much as possible." Unfortunately no reports or cubing were shown at the exhibition of drawings, so that we had no means of comparing the size of this scheme with that of others; but we should imagine that the contents with the large corridor space must be high, and the price per cube foot, including stone-mullioned windows throughout, could not be low.

The second premiated design, by Mr. A. T. Greenwood, shows a symmetrical and elongated plan. Practically the whole of the school is placed on the ground floor; the art-room, dining-room, and boys' common-room alone being on the first floor. The chemical and physical laboratories balance to the north, and the classrooms are all to the south. Future extension is well arranged for on either side of the hall on the first floor. Most of the specialised rooms are too small—the physics and chemistry rooms contain benches for twenty instead of the thirty asked for. The elevations are not particularly attractive, and the interior of the hall is overburdened with a long and heavy colonnade of unrefined design.

The third premiated design, by Messrs. Packer, Drewitt, & Drewitt, represents a good example of the typical plan before described. The classrooms range on the south side, with the cloaks and latrines for seniors and juniors at the extreme end of either wing. On either side of the hall are grouped the manual instruction room and gymnasium, and the physics and chemistry rooms. The position of the manual instruction room along one side of the hall is perhaps open to objection, and the junior classrooms open direct off the hall without any means of separation. On the whole, however, we like this plan the best of the three premiated, and the elevations are simple and school-like. Messrs. Russel & Cooper's plan was also on the same lines, and their elevations more attractive with the exception of an unfortunate central regimental pediment.

Perhaps the best plan on these lines, and one of the best plans we ever saw for a secondary school, was submitted by Messrs. Wills & Anderson. Their chief characteristic, as compared with the typical plan, was the placing of two cross-wings at the ends of the long range, containing *not* entrances and latrines, but chemistry, lecture-room, and physics on one side, and gymnasium, dining-room, and manual instruction room on the other. This arrangement would work excellently, and the whole school appeared to be thoroughly well planned. The elevations were very quiet but dignified.

Among designs on rather different lines was noticeable a very economical and simple plan by Messrs. Shepheard & Bower (Liverpool). In this case the corridor was taken out from the north side of the hall, giving the great projection to the south side, and the classrooms, being placed on three sides of the central hall, were not all exposed to due south light—this would be a distinct advantage in hot weather. At either end of the wings are the chemistry and manual room on the ground floor, and the physics and gymnasium over. The elevations were good, and there was a considerable degree of richness about the front entrance.

The distinctive characteristic of Mr. F. Q. Farmer's (Liverpool) scheme was the placing of all the classrooms on the assembly hall floor. In order to do this he used a sub-ground floor containing cloaks, dining-room, kitchen, common-room, workshop, and gymnasium. This produced a compact block for the building, and there was ingenious lighting to the staircase from the ends of both flights.

It was rather interesting to observe several sets of drawings taken almost directly from well-known types of schools—one of Mr. Arnold Mitchell's especially, which has been illustrated of late. The authors of these borrowings were fairly safe on the small scale ($\frac{1}{16}$-in.) drawings, but entirely came to grief on the $\frac{1}{2}$-in. detail, which showed a want of acquaintance with the treatment of architectural detail.

The drawings were on view in the Harris Institute at Preston on Friday and Saturday, November 19 and 20.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary fortnightly meeting of the Architectural Association was held on Friday last week at No. 18, Tufton-street, Westminster, S.W., Mr. Henry Tanner, President, in the chair.

The minutes of last meeting were read and confirmed, and the following gentlemen were elected as members of the Association, *i.e.*, Messrs. W. B. Stedman, Crouch End; R. G. Hopcraft, London; and W. Paramor, Brixton.

It was announced that a Debating Society meeting will be held on November 26, when a paper on "Competitions" will be read by Messrs. W. G. Wilson (on limited competitions) and K. Gammell (open).

The Architecture of the Incas of Peru.

Mr. C. Reginald Enock, F.R.G.S., then read the following paper on "The Architecture of the Incas of Peru":—

"A study of the architecture of the Incas of Peru takes us back into the interesting—almost fascinating—past of what we now call the "New" World. Upon the plateaux and slopes of the great snow-crowned Cordillera of the Andes, fronting upon the boundless Pacific Ocean, towards the setting sun, we encounter a series of ancient buildings and stone structures so remarkable as can only be compared with those of the Nile; to which, indeed, they have a certain analogy, as we shall see.

Topographical Conditions.

First of all, let us briefly consider—and it is necessary to a proper understanding of the subject—the topographical conditions surrounding the old Empire of the Incas. As we approach Peru from the sea we are confronted with a long, sterile shore, beaten by tearing surf between the few havens. There is no sign of life upon the seaboard, except the cry of the seals and the occasional flights of guano-producing sea-birds, which fly at times in veritable clouds upon the face of the water. As for man and his habitations, except for the few seaports and the streets and houses clustered around them, and the irrigated plantations in the vicinity of the few rivers which descend from the Andes to the sea, across the 80 to 100 mile wide strip of coast lands, there is nothing to be seen. The coast lands are mainly sun-beat deserts, which for hundreds of miles separate the valleys where agriculture is possible under irrigation. For the coast-zone of Peru, lying between the foot of the Andes and the Pacific Ocean, is a rainless region—rain never falls there—1,400 miles long, extending southwards into the appalling deserts of Tarapaca, in Chile. Nevertheless, it is upon this coast-zone, which enjoys a generally excellent climate in other respects, that the Spanish-American peoples have mainly taken root; and Lima, the handsome capital of the Republic of Peru, is situated thereon, a short distance inland, as well as other cities.

Crossing this dry coast-zone we rapidly ascend the Andes, and encounter climatic conditions exactly the reverse of those we have left below. Heavy rainfall and snowfall, bracing and rarefied air, and perpetual snow upon the summits are the characteristics of this lofty region, the roof of the South American world. Topographically this region consists of great, high, bleak plateaux, from 10,000 ft. to 16,000 ft. above sea level, absolutely treeless; and to reach these from the coast or from the interior, or indeed from each other, we have to cross the intervening ranges of the Andine Mountain system; vast parallel ranges whose passes are rarely less than 14,000 ft. above sea level, and whose summits rise in some cases to more than 20,000 ft. elevation, far above the line of perpetual snow. I have crossed these inclement plateaux, passes, and summits on many occasions, and retain strong recollections of toilsome yet pleasurable days and months spent on mule-back amid their alternating sunshine, rain, and snow. Some of the snowy passes and peaks, indeed, which I crossed or ascended on foot over the perpetual snow-cap had never been trodden previously by the foot of a white man, nor, indeed, of any human being. The mountain sculpture of the Andes is beautiful and striking; the rising or setting sun tinges the snow-crowned peaks with that ruby glow known only to the Andine or Alpine traveller, and the vast heavenward-pointing ridges of upturned strata of the Silurian or Cretaceous periods, and the great uplifts of plutonic rocks form mighty façades and far-reaching Andine towers and aisles—an eternal architecture which surmounts the work of man's hands that lies below, and perhaps has influenced its character.

Mural Remains.

I have dwelt thus upon the climate and topography of Peru because it bears in an important way upon the architecture of the Incas and pre-Incas who flourished there in past ages. The mural remains of these people, their great monuments in stone and sun-dried brick are found all over the region of the Cordillera, and to a lesser extent upon the coast; and their character varies much in accordance with their situation and climatic environment. Thus upon the rainless coast-zone the buildings were largely of adobe, or sun-dried earthen bricks; the well-known material used throughout Spanish-America to-day, whether in Mexico Peru, or Chile; whilst as we rise to the rainy region of the mountains we observe that they are of stone, shapen or unshapen. The adobe lasts for centuries on the dry coast plains; it would have perished long ago upon the rainy plateaux and become obliterated; and here it is that the beautiful examples of the stone-shaping art of these pre-Hispanic people is found in its perfection. The whole region over which these monuments are found may be taken as more than 1,500 miles long by 300 miles wide, extending throughout what is now Ecuador, Peru, Bolivia, and part of Chile—an enormous range of territory for a semi-civilised people to influence, and greater than that which included the civilisation of the Euphrates and the Nile together.

The Inca Empire.

The Inca Empire, it will be recollected, flourished, as far as can be ascertained, from the time of the first Inca, Manco Capac, who founded the dynasty at the beginning of the XIth century of our era, to the time of the arrival of Pizarro and the overthrow of Atahualpa, in 1532. But the Incas were not the first civilised people of Peru. They were preceded by, and probably inherited their civilisation from, the Aymaras, whom they probably overthrew. The various mural remains throughout the country are, therefore, of different people and periods—some only nine to five hundred years old, others being of much more remote epochs, measured possibly by thousands of years.

Roads.

The Empire of the Incas, at the time of the conquest of Peru in 1532, had as its main centre Cuzco—the word itself signifies "the navel"—in modern Peru, and Quito, the capital of Ecuador, upon the equator; and these centres were connected by the famous Inca roads, which some historians—generally those who have not seen them—have described as equal to the roads of the Romans, which statement is far from being true. They were, however, means of communication of the utmost value to the Empire, and although they were nothing more than

trails for the llamas, those wonderful camels of the Andes which were the only beasts of burden known to the people, who consequently possessed neither horses nor wheeled vehicles, they gave access from place to place, and were traversed by the remarkable system of posts and postmen maintained by the Inca Government. These roads, from Cuzco to Quito, were more than 1,100 miles long—a distance greater than that from the Euphrates to the Nile. Moreover, as engineering structures even, these roads were of considerable merit, crossing by rock-hewn steps the summits of the Andes above the perpetual snow-line, passing swampy lands by stone causeways, and rivers by means of the remarkable suspension bridges made of woven grass or osiers, and by stone structures.

Castles and Fortresses.

There were two main roads. They both traversed the country longitudinally along the line of least resistance paralleling the ranges of the Andes. One, the most remarkable, ran along the high plateaux and summits of the Andes; the other followed the low-lands of the coast. The groups of buildings which we are to consider are in some cases disposed along the line of these roads, or are adjacent thereto, portions of the roads only remaining here and there. The structures consist mainly of castles and fortresses, temples, palaces, astronomical observatories, tombs, and groups of habitations or towns. All of these are now abandoned and in ruins, with the exception of some which form part of recent Spanish-American structures at Cuzco. In passing, it may be said that the Moorish type of building inherited from Spain looks exceedingly incongruous and evanescent in comparison with the solid massive Inca masonry beneath it, in the few instances where the two are encountered together.

Lake of Titicaca.

To describe first the ruins of most notable occurrence. These are situated in the neighbourhood of Cuzco, and upon the region bordering upon the great Lake Titicaca. This lake, it will be recollected, is of its kind the most remarkable in the world, being 12,350 ft. above sea-level, and so large that we may navigate upon it out of sight of land. It is remarkable also in being, in company with some other lakes, a hydrographic entity, which has no outlet or means of exhaustion for its waters, except that of evaporation, as far as is known.

City of Cuzco.

Cuzco is about 200 miles from the lake, and was the great Mecca of the people and the seat of government. Overlooking the city—which to-day is an important, populous place, standing 11,000 ft. above sea level—is what is perhaps the most remarkable prehistoric building in the New World, and indeed in some respects in the whole world. This is the fortress of Sacsaihuaman. It consists of a series of four or more great walls, from 12 ft. to 25 ft. high, forming terraces up the hillside 1,800 ft. long. The walls are built as great revetments, with twenty salients at regular intervals, the masonry being formed of Cyclopean worked stones, which in some cases are nearly 20 ft. high, weighing many tons. Indeed, we are at once struck on observing the walls of this fortress, as well as those of others of the Inca buildings, with the remarkable character of the masonry, not so much by the size of the monoliths as by what is either a singular disregard of uniformity and alignment in the joints, or is a curious, purposeful variation of these. Thus we see that each stone is an individual, not a counterpart; a polygon, not a cube. In many cases the stones are cut out to fit each other in a way such as must have involved much labour, especially when it is recollected that the Inca masons probably had no means of laying out angles; so that presumably the stones were made to fit each other by the laborious method of constantly removing and replacing. It has occurred to me, although I may be wrong, that this giving of an individuality of form to each stone was a nice and purposeful art, or carried out for some now unknown reason. Notwithstanding this diversity of surface, the contact between the stones is generally so perfect that a knife-blade cannot be inserted; and there is no mortar. In some of the temples—it is stated by the Inca historian, Garcilaso—gold and silver was used as a bedding material for the stones. Whatever may have been the reason for this lack of uniformity in the Inca masonry, it is singularly beautiful and unique, and the walls have well resisted the ravages of time and the elements. In the streets of Cuzco some well-preserved examples of Inca walls form part of modern buildings, as before mentioned. A good example is the wall which was the base of the Palace of Huayna Capac, one of the later Inca emperors. Here massive stones are encountered, polygonal in form, fitting perfectly into each other. One of these, it will be observed, is a twelve-sided polygon. This wall forms part of an Inca street which is used to-day. In the city of Cuzco there are various other buildings, notably the remains of what was the Temple of the Sun. Overlooking the valley we have also the singular steps or terraces, cut out of the living rock, which is termed "the seat of the Inca," and it is stated that the Inca Emperor took his seat here to watch the construction of the great fortress.

Yucay Valley Fortress.

At about a day's ride from Cuzco we reach the head of the Yucay Valley and see its base 4,000 ft. below. Upon the slope of this remarkable valley—it is one of those which drain into the affluents of the Amazon—the ruins of another remarkable fortress are encountered—that of Ollantaytambo. This also consists of great terraces of Cyclopean masonry. We also observe here, in this structure, a common feature of Inca architecture—the series of niches in the walls, with their characteristic trapezoidal form, giving a unique and handsome effect. No style of building could accord so well with its environment as these massive structures of the Incas. Possibly the builders were influenced by the mighty mountains which overhang their valleys, as I have before averred, and strove to adapt their work to the stupendous Andine architecture on every hand, fashioned by the "Unknown God" to whom their temples were raised.

Other Fortresses.

Another remarkable group of ruins in the same region is that of Intihuatana and Pisac. The latter is another imposing fortress upon the summit of the mountains, a remarkable situation with an extensive view of the surrounding cañons. But this fortress of Pisac had its own sacred purpose. It enclosed—and still encloses—the temple wherein stands the famous astronomical stone or pillar of Intihuatana. This word means in the Quechua tongue, "the seat or throne of the sun," or the place "where the sun's rays are collected." The pillar was, in fact, the instrument by which the Inca astronomer-priests determined the solstices. The column, now broken but still existing, is worked out of the solid rock. It is enclosed by a circular tower, and in this the priests observed the shadow of the column upon an east and west line inscribed upon a circle which surrounded it. When the day approached great feasts were celebrated, and a golden stool was placed upon the shaft so that "Inti," the sun, might "sit down" upon it, for the solstice. There were others of these astronomical pillars throughout Peru and Ecuador, but they were generally destroyed by the Spanish priests after the conquest, as "things of the devil"! The fortress and buildings surrounding the column-chamber are beautifully executed—stone-built corridors, halls, and chambers; whilst the whole place, surrounded by beetling precipices and protected by revetments of granite masonry, are impregnable. In the rock walls of the valley are seen ancient tombs in absolutely inaccessible positions to-day. These great fortresses commanded the valleys leading down to the region of the Amazonian forests below, and were to protect the empire from the incursions of the savage tribes dwelling there. Even to-day the forest region beyond the Andes is a savage, unexplored territory in great part, inhabited by bands of Indians, although the business of rubber gathering is opening it up to some extent.

Ruins of Tiahuanaco.

We shall now leave the regions of Cuzco for that of Tiahuanaco, near the southern end of Lake Titicaca, about 300 miles away on the border of Bolivia. Here we find ruins which in a sense are more remarkable than those of Cuzco, because far more antique. The temples and fortresses of Cuzco date only from the beginning of the XIth century, as stated, of the Christian era, when the Inca dynasty came to being; those of Tiahuanaco and others are of unknown age, and doubtless were built by the Aymaras at the time of their greatest culture before their overthrow. Some writers, indeed, have maintained that they were contemporaneous with Babylon or Assyria. But be it as it may, they are of a different type to that which the Inca stone-shaping art produced, and they form the ruins of the oldest city in the New World. here upon this high, bleak, sterile plateau of Titicaca, more than 2 miles vertically above the level of the sea.

The ruins of Tiahuanaco consist mainly of the outline of a great temple, shown by rows of upright monoliths, foundations, parts of stairways, a great stone doorway, and some colossal stone figures. It has been a question how these great monoliths were transported here, but if we take into account the hydrographic conditions of the site, which might have been formerly an island when Lake Titicaca was more extensive than even now, it is conceivable that they were floated to the spot, and possibly their quarries were nearer at hand than has been supposed. Indeed, quarry sites have been established in the neighbouring hills. But, on the other hand, some of these monoliths, both here and at Cuzco, have been transported for great distances over the most broken country imaginable, and their carriage presents the same question as has been aroused concerning the monoliths of Egypt. Near Cuzco is an enormous stone which had been abandoned on the road, and an Indian tradition says that the stone "wept tears of blood" at being left there. These great stones of Tiahuanaco, unlike the Inca walls, are often very richly carved. The most remarkable of them is the monolithic doorway of Akapana, with its carved figures, the central one of which has been taken by Peruvian archæologists to represent the mystic deity Huirakocha. Some of the lesser figures have human bodies, hands and feet; some human heads, others heads of condors; some wear crowns and carry sceptres, and they appear to be in an attitude of adoration of the central figure, which itself holds sceptres, carved with the heads of tigers and condors, which were probably symbolical of strength and power. This central figure of Huirakocha (or Viracocha) was the supreme god of the Andine people, typical of the "Abyss of the Waters," as was "Ea" among the Chaldeans. Among other notable monoliths of this group of pre-Inca ruins is a great stone image, about twice the height of a man, which stands upon the plain.

Ruins on Islands of Lake Titicaca.

Upon the islands of Lake Titicaca there are other remarkable ruins, both Inca and pre-Inca. From this island it was that Manco Capac, the first Inca, whose virgin birth as a redeemer of man is part of the Inca mythology, set out to civilise the savage tribes of the Andes. There are many ruins

on this island, as also upon that of Coati; ruined temples to the sun and the moon, the former of which the Inca worshipped as symbolical of a greater Deity. There was, indeed, much that was chaste and ethereal in the Inca religion. They imagined a Supreme Being, an "Unknown God," who pervaded everything but who could have no visible or tangible form or likeness; and they did not set up idols, nor were human sacrifices performed. The image of the Creator was represented at Cuzco by an elliptical plate of gold set on the wall of the temple. In the Titicaca region there is also a remarkable ruin, known as the "Temple of Huira-kocha"—huge walls which probably were never completed; work of the Aymaras.

The Region of the Upper Marañon.

If now we leave this part of Peru and Bolivia and journey to the north some 700 miles — or about 400 from Cuzco — we reach the region of the Upper Marañon River, where we encounter several other beautiful examples of the Inca and pre-Inca stone-shaping art. Indeed we shall have passed other vestiges of their time upon the way, such as the monoliths of Huaitara, and ruins of prehistoric villages in many places. The modern capital of this region is the town of Huaraz, a typical Andine city, 10,000 ft. above sea level, and overhung by the snowy Cordillera to the east. There are many vestiges of the Inca period here, but we shall cross the main range of the Cordillera; and one of the passes which I have traversed on various occasions is an old Inca pass of rock-hewn steps at an elevation of nearly 15,000 ft. We then descend to an affluent of the Marañon, upon which is situated the remarkable Castle of Chavin. This castle, which I explored, is largely in ruins, but there are numerous singular underground chambers and passages, the purpose of whose construction it is difficult to understand. The walls are of blocks of hewn stone. But the main point of interest here is the singular carved monoliths, doubtless of pre-Inca origin, which exist or existed here. One of these, a beautifully-carved stone about twice the height of a man, was transported over the Andes and down to Lima, on the coast, where it stands in the Exhibition Park. Another in the form of a column yet remains in place, and there I examined it.

The whole of this remote region of the Upper Marañon is dotted with the ruined dwellings of the former occupiers of the land. Houses, streets, fortresses, sometimes in the most inaccessible positions, upon appalling crags, towards which the night-mists from the Marañon roll up in fleecy folds like a mysterious pall, and from them these ruined castles and walls start suddenly as we behold them, like the ghosts of the dwellings of a vanished race—which indeed they are—weird and unique. I have, upon my expeditions with my men and mules, often been obliged to sleep in these ruined places, sheltering from rain and snow, and my men have cooked the evening meal in the old fireplace of perished Inca chiefs! The disposal of these numerous ruins, often about a central fortress commanding the heads of valleys, and surrounded by the abandoned "andenes" or terraced fields of these people, goes to show that the inhabitants lived as clans, or "Gentiles," and their ruined dwellings are termed by the Indians of the Andes to-day "casas de los Gentiles," or "houses of the Gentiles." These "andenes," or cultivated terraces, are a most striking feature of the Andes. I have journeyed among these interminable slopes in many places, and at sunset especially the "andenes" come into view, giving a singular rippled appearance to the sides of the profound valleys. They go to show how every available foot of ground was cultivated under the Incas, who were splendid agriculturists, and how extensive must have been the population in pre-Hispanic times of these vast regions, where, since the advent of the European, only scattered villages and mouldering ruins now exist. It has been calculated that the population of the Inca Empire might have reached 90,000,000 souls, but I consider this greatly overestimated. It is not difficult, however, to conceive a people as numerous as that of Great Britain to-day.

Ruins of Huanuco Viejo.

The most remarkable group of ruins in this region is that of Huanuco Viejo, of which I made a special study. It stands upon a broad, flat plain upon an arm of the Marañon, at an elevation of about 12,000 ft. above sea level, and consists of an extensive palace, a fortress or temple of the sun, baths; and a extensive village of streets, with a singular series of round and square dwellings, alternating, in long rows. The chief architectural feature of the buildings is a series of stone doorways, really beautiful examples of Inca masonry, and the castle or temple. In the palace there are six of these doorways, all standing in a line at considerable distances apart, so that the observer who takes his stand in front of one of them is enabled to see through the whole series. The line so taken through them is about east and west. The total length across the courtyards or halls to which these doorways give access is about 400 ft. The doorways are of typical Inca tapering or trapezoidal form, with quoins and lintels of beautifully-fitted stones of the more or less polygonal form previously described, and so closely fitted that a knife-blade cannot be inserted in the joints. No mortar has been used. The lintels are monoliths of nearly 7 ft. in length in some cases, and the thickness is about 3 ft., which is that of the walls of which they form part. The characteristic niches, also of trapezoidal form, are a marked feature of the walls of these ruins.

The castle, which stands in the centre of what was a huge square, around which the palace or palaces are disposed, is a building of different character. It is rectangular in form, about 100 ft. wide and 170 ft. long, very solidly constructed of cut stone blocks surmounted by a cornice, whose moulding is composed of a fillet and cavetto, as in the Doric order. The whole plain in the vicinity is covered with the ruins of small habitations, generally of unhewn stone. All the masonry of these ruins is composed of blocks of silicious limestone, which have been extracted from a stratified hill at the edge of the plain.

This plain and its hills, and the ruins of the palaces, castles, and dwellings are absolutely uninhabited, except for an occasional Indian shepherd, and these, I was informed by my men, occasionally vary that occupation by horse-stealing. I pitched my tent under the shelter of the palace walls, and in the night a commotion among my mules seemed to suggest that some prowling robber might be about; and as a warning I lifted up a corner of the tent canvas and fired a couple of revolver shots out into the night air. When morning dawned we found tracks of sandalled feet, but nothing was missing. I sketched the chief features of the place, and rode along the abandoned streets of the Inca village, where even as late as the time of the Conquest the Incas maintained a population of 30,000 souls. Now the wild oats waved above the entablature of the palace of the Incas, and the declining rays of the sun fell softly across their ruined walls as I ascended the range of hills above the Marañon. These ruins of Huanuco Viejo are of much interest, and as far as I am aware they had never been previously examined and depicted. My photographic films had become exhausted, and I have only my sketches to illustrate them, which, however, were made with exactitude. One remarkable fact we must recollect in regard to these great stone structures of the high plateaux—they are in a region at a vast elevation above sea level where there is little vegetation, absolutely no timber, and where corn or other cereals will not grow.

Ruins on the Coast.

We will now leave the high region of the Sierra and descend to the coast. The principal ruins of the Incas, pre-Incas, and other semi-civilised former occupants of the land, such as the Chimus, are mainly of buildings constructed of adobe, and have remained—where they have remained at all—due to the dry climatic conditions as before mentioned. The most famous of these ruins formerly was that of Pachacamac, which at the time of the Conquest was a splendid temple raised to the "Unknown God"; and great spoil of golden vessels and plates was secured from this place by the Spaniards in the ransom of Atahualpa. The name, "Pachacamac" signifies in Quechua—the language of the Andine people—"He who gives animation to the Universe." To-day nothing remains of this great temple but a mound of rubbish, a day's ride from Lima. Proceeding along the coast-zone to the south we shall reach a group of ruins known as "Incahuasi," or "the house of the Inca." These, unlike the coast ruins generally, are of stone, although they lack the beautiful workmanship of the mural remains we have visited in the Andes. But they are unique in one respect—they contain a row of columns. This is an architectural feature absolutely unknown in the Inca and pre-Inca ruins elsewhere, for, except in this case, the column was unknown to the Andine people, as was the arch. The columns of Incahuasi are not monoliths, however. The building probably dates from the XVth century. Still further to the south, slightly inland from the port of Pisco, we encounter an extensive group of adobe ruins in a good state of preservation, consisting of long walls with characteristic trapezoidal-formed doors and niches, and corridors, halls, and rough stone foundations. I took a careful sketch of these features. The niches are still coloured with some red pigment, possibly vermilion from the great quicksilver mines in the Andes to the east, for vermilion was obtained from the cinnabar to paint the faces of Inca beauties, we are told by Garcilaso, the Inca historian.

Still further south in this coast-zone of Peru I encountered remains of long aqueducts, a line traceable for 80 miles along the hill-slopes, for the Incas were expert in hydraulics and irrigation works. There are other long ruined aqueducts in other parts of the country also.

Taking our way now far to the north, we come to the region where the Chimu people flourished, who were overthrown by the Incas. They were a powerful semi-civilised coast people, and numerous ruins attest their skill in mural construction. Among these the most notable are the ruins of Chan-Chan, whose walls show florid decorations, elaborated in cement. These ruins are not far from the modern city of Trujillo, and would repay careful study.

Inca and pre-Inca Architecture.

It would be impossible within the space of this paper to dwell at greater length on the ruins of the early Peruvians I have enumerated, and those others scattered throughout the land; and I must content myself now with a few general particulars. As we have seen, the Inca and pre-Inca architecture differ much, to those who have made a study of them. The first lack any iconographic carvings, such as we have seen at Tiahuanaco and Chavin. Monoliths of considerable size were common to both; one of those at Cuzco is 27 ft. long, 15 ft. wide, and 12 ft. long, and there are others of almost equal size. The stones vary as to their geological composition according to the region; some are of granite, as at Cuzco, some of trachyte, sandstone, or basalt, whilst others are of a hard, silicious limestone. It is to be recollected that this remarkable stone-shaping art was performed without the use of iron; but the Incas possessed bronze, termed *chumpe*, and copper tools. Indeed, they were skilled metallurgists in copper, gold, and silver,

As previously stated, the Incas were unacquainted with the arch, but nevertheless they constructed dome or "beehive" roofs, both to their tombs, at times, and to their conical houses, whether of stone or adobe. They also employed the principle of corbelling-out over openings, and to form the abutments of small bridges. In general terms the principal characteristic of the Inca architecture is its great solidity. It would seem that the builders had desired to bequeath to posterity these chapters in stone of their history; and, indeed, it is safe to say that these may be expected to outlast any of the modern structures of America, whether the architectural work of Colonial Spain—good and solid as this is generally—or whether the evanescent skyscrapers of the Anglo-Saxon on the Northern Continent. Solid as these walls are, however, the roofs of the large buildings have perished long ago; as their builders do not appear to have been able to advance beyond sloping roofs of poles covered with grass thatch; or, at any rate, in the absence of anything else we can only assume this to have been the case. Their buildings, with small exception, are never of more than one story. Nor were they acquainted with the use of burnt brick, although their ceramic art was an advanced one, as we know from the beautiful and abundant Inca pottery. In the shape of their vases (as well as in the form of some of their buildings) they showed a curious knowledge of acoustics. There were no doors to the houses, the openings being covered with a mat. The interiors of the temples were covered with plates of gold, of which the Spaniards secured great booty.

The Land System.

In conclusion, we will now cast a brief glance at the land system of the Andine people, which, in view of the present controversy in Britain regarding land tenure and small holdings, is of much interest. The land laws of the Incas were exceedingly philosophical. All the land was measured and surveyed; every available hillside was banked up and terraced, forming the "andenes" already spoken of; a portion of the land was set aside to be worked for the benefit of the Sun, or let us say the Church, another portion for the Inca or the Government; whilst the bulk of it was portioned out among the people, each head of a family receiving his holding, with an added plot for each addition to his family. Everyone was obliged to work his holding, and destitution did not exist; nor was begging permitted, as every citizen was provided for and could support himself and family by his own crops and herds of llamas. Taxes were payable in goods, not money, and the whole system was a prosperous and beneficent one, under monarchs who had the welfare of their people at heart. Indeed, the organisation of land, food supply, and work, without waste or poverty, was so beneficent a one as has never existed under the rule of any Christian nation or monarch. The advent of the Europeans destroyed this promising system, and the only useful remainder which the poor dweller of the Andes inherits to-day from his Inca forbears is the system of land tenure, which is wisely perpetuated by the modern Government of Peru. That is to say, the small holding of the peasant is inalienable by law; so the Cholo of the Andes lives in undisputed possession of his little holding, wrested from rocks and thorns; but it is safe to say that he owes this security partly to its inaccessibility. Otherwise his land would doubtless have been snapped up long ago by the large landholders, after the custom of other American and European peoples. The social system of the Incas, whilst it had its excellent points in that destitution was impossible, did not tend towards social advancement, although what might have been evolved if the civilisation had not been destroyed it is impossible to say. Their social *régime* has been described as a species of Socialism, under a beneficent autocratic Government.

The Origin of the Incas and pre-Incas.

A few words as to the origin of the Incas and pre-Incas, and I shall have finished. I do not think anyone who has made a study of the matter will deny that the stone-shaping art and some other arts (not only of these people, but of the Mexicans, 3,000 miles away to the north) must have been inherited rather than evolved. More—the people themselves must have been immigrants originally, rather than autocthonous. But from where? The generally assigned origin is from Asia, and the Mongol cast of face is very noticeable among the pure indigenes both of Peru and Mexico. As to their arts, an origin has been assigned in Egypt and in Mesopotamia. We have seen the tendency to the pyramidal in the Inca structures, giving some atmosphere of the buildings of the Nile. A host of other analogies have been adduced. The use of copper tools, the custom of embalming the dead, for mummies are common objects in the Inca tombs; the Indian canoes of Lake Titicaca, with their turned-up prows and mat sails, which are the counterpart of such a craft figured on the tomb of Rameses II.; religious customs, including sun-worship and moon-worship; matters of design upon pottery and woven textures; the wearing of sandals; and, above all, their stone-shaping art and their transport of monoliths. Into this fascinating field it is beyond the province of this paper to trespass further. The theory of Asiatic or Egyptian origin has been strenuously denied and strenuously supported, and the approaching shores of Behring Straits, where America touches the fringe of Asia, have been pointed to as the probable path which these prehistoric immigrants followed, when, bearing in their bosom the germs of a civilisation and a religion from the ancient world, they passed down these 10,000 miles of Pacific littoral and inclement Cordillera of America. Well may we ponder on their mystery, as, standing amid the ruins of these bygone empires of the Andes, we watch the sun-god of the Incas sink in the Occident."

Mr. R. Phené Spiers, in proposing a vote of thanks to the lecturer, said he had never been in Peru, but he was much interested in the subject. There seemed to have been two kinds of buildings in the country, *i.e.*, those of sun-dried bricks, or adobe, in the lower portions of the valley, or coast, where rain did not fall; and those built in the rainy upper parts, where there was plenty of stone, but no timber, and where the builders covered their stone structures without the ordinary means of covering over such buildings. The lecturer had drawn attention to the raking walls of some of the ruins illustrated and to certain forms which he thought might have been derived from Egypt; but those raking walls were in stone, and were copies of the earliers structures in unburnt brick, where the wall were always thicker at the bottom. It was quite certain that the sloping sides of the doorways in the illustrations shown could not have been derived from the sun-dried brick buildings, and it was a mistake to suppose that the doorway was like an Egyptian doorway, for no Egyptian doorway was ever built with sloping jambs—the sides must have been vertical, for crude bricks would not carry if leaning over. The inclined jamb of the Inca doorways must have originated in stone material, and the rake was employed in order to lessen the bearing of the stone architrave, especially necessary as the Incas did not seem to fear putting large stones and weight on the top. A singular point, and one as to which he was not at all satisfied, was how the Inca builders covered over their buildings. Mr. Enock suggested that poles carried sloping roofs—perhaps because he was able to show photographs indicating the same. But he (the speaker) did not think that was the ancient way, and he thought that the roofs in the valley houses were always flat or domical—most likely flat, because when covered with earth they would form a pleasant place to sleep in at night, and throughout all eastern countries they were flat or domical. As to the sculpture, he was afraid he could not suggest any origin for it. He could not recognise any trace of another race influencing it. In one of the illustrations they had seen what was known as the Greek fret, but that existed in other countries independently, and he thought it had a natural occurrence. As to the cyclopean walls they had seen on the screen, the extraordinary resemblance to some of those in Greece was astounding; there was no difference at all. Each nation or race must have used the material the best way they could, thus evolving similar construction; horizontal courses of stone were introduced when out of stratified rock. So it was always the material which determined the construction. He had great admiration for some of the examples of masonry the lecturer showed them, and it must have involved immense labour to have produced the bossing-out in the centre of the huge blocks of masonry used. M. Choisy had shown how such great blocks of stone were used; those at Baalbek in Syria were larger than those used by the Incas, and it was certain that some means of transporting these blocks was employed of which we had no information.

Mr. F. D. Clapham seconded the vote of thanks, and referred to the extraordinary civilisation of the people under the rule of the Incas. Their roads and bridges must have been marvels of engineering, and they had left behind them ruins of remarkable monumental buildings and works.

Mr. G. Leonard Elkington supported the vote of thanks, and said that the architecture of the Incas, *i.e.*, subsequent in date to the advent of Manco Capa, was distinctly disappointing. The buildings of this period which had been thrown on the screen had chiefly impressed him by a similarity to the structures associated in one's mind with Tibet and Central Asia. The examples of pre-Incal architecture, however, were quite superior in interest, and indicated clearly that an advanced civilisation had existed in Peru from an early date which could not now be fixed definitely. He thought the Inca domination had been overrated; not only had Peruvian architecture failed to advance under it, but in the short space of 400 years that that domination obtained the people themselves had become such that Pizarro and his handful of Spaniards were able to master them without any difficulty. The lecturer had touched upon one of the enigmas of ethnology—who were these early people and whence came they? Like Mr. Spiers, he (the speaker) had closely followed the illustrations of the architecture given, in the hope of detecting some characterisitic of construction or some element of design which might serve to narrow down the possible solutions of that problem. Mr. Spiers had dealt with some of these features. In Peruvian art the use of the fret ornament was accompanied by two distinguishing characteristics—the pattern was not continuous as in Grecian examples, but was repeated in short lengths, and its lines were formed in a peculiar stepped manner. It was of course true, as Mr. Spiers had observed, that the use of the fret ornament was practically universal, and it was possible that such use might have been derived from an accidental but general observation of the meshing in weaving, but it was also easy to account for such use and for many of the other analogies mentioned in the paper by an original common parentage of the pre-Incas with an Old World people. One of the slides shown, a large carved human figure, was strongly reminiscent of those found on Easter Island, and for which the natives cannot account, even by legend. The profuse

use of carving on other examples seemed to point to the theory of Asiatic origin, whilst the cyclopean walls and the use of the vaulted dome recalled the prehistoric Pelasgic cities such as Tiryns, Mycenæ, etc. In this connexion it was a curious fact that the Argives themselves had a legend that, a long while after their foundation and before the building of Mycenæ, a race of Phrygian princes, *i.e.*, from Asia Minor, came amongst them and established a strong kingdom. If the common parentage theory can be maintained, the point of how the stock was transplanted in the New World arose. Early communication with Asia, *viâ* the Behring Straits, had been mentioned, but it was equally feasible to imagine that perhaps some of the first navigators had been carried by stress of weather far from their native lands, just as had happened to Ulysses on his homeward journey when Troy had fallen. As bearing on the overseas theory might be instanced the belief in a lost Atlantis, a vast island fabled to have existed where America was subsequently found, which undoubtedly obtained amongst the Greeks; he believed Solon wrote thereon, and Plato in his incomplete "Critias" also treated the same subject. Pizarro, too, found his task the lighter, it is said, because of an extraordinary and almost pathetic readiness on the part of Atahualpa and his people to welcome the Conquistadores, as the long-expected white men from over the waters of the Inca legends. These matters of course were purely romantic, but were an interesting outcome of the paper that evening. On the point of the estimated population of the Inca empire, it was difficult to imagine that so great a number of people as 90 millions, or even the lesser figure of Mr. Enock, could have subsisted in so sterile a country, even making every allowance for their energy and skill in works of irrigation and cultivation.

Mr. H. W. Brittan asked whether there was any purpose, as far as was known, in the niches of one of the great works shown.

The Chairman, in putting the vote of thanks, said that the architecture of the Incas was of a primitive character, but of great interest. The builders of the time must have had a very reliable mortar.

The vote of thanks having been heartily carried.

Mr. Enock, in reply, said as to the roofs, in the rainy districts he did not think they could have been flat because they would not have kept the rain out very well, though probably they were flat in some places. In one of the views he had shown there was the appearance of a double gable end, as if a sloping roof had been used. It was generally held that poles, covered with thatch, must have been the form of roof used; and though that would have looked primitive on cut-stone walls there was no other conclusion to arrive at, and as far as we knew the Incas used no other form than that used by the inhabitants of the Andes. As to the rake or batter of the walls having been evolved from similar construction in sun-dried bricks, he thought that was so; but if it were, the idea might have been brought from somewhere else. Moreover, the trapezoidal form of doors and the raking walls were not in the sun-dried brick buildings, but only in the cut-stone ones. Reference had been made to the woven bridges of the Incas, some of which still existed. They were remarkable structures, crossing enormous ravines, it might be 200 yds. long. As to the niches, it was not known what they were for, but probably they were something in the nature of panelling or ornament, though they might have had some other purpose.

The Chairman announced that the next meeting will be held on December 10, when Mr. F. C. Eden will read a paper entitled "Varallo, Orta, and Varese."

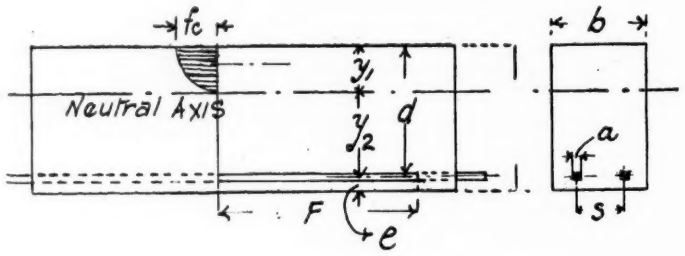
The meeting then terminated.

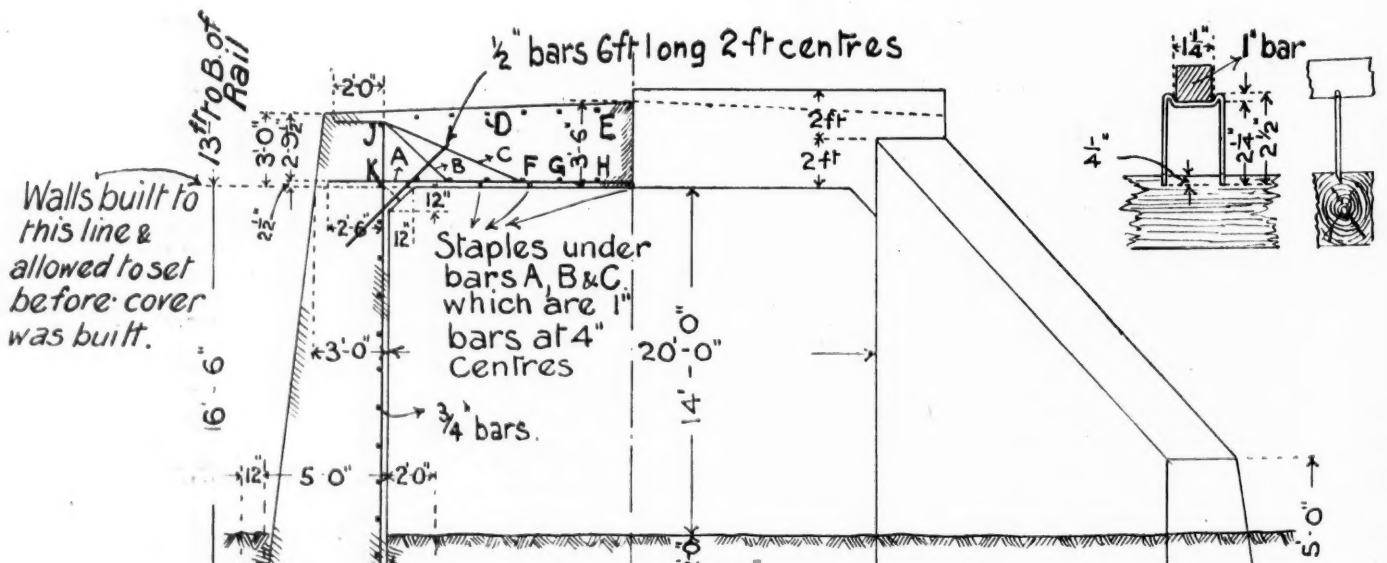
AN EARLY AMERICAN CONCRETE BRIDGE.

THE American engineers were amongst the first to make use, to any considerable extent, of reinforced concrete. The figure, taken from a paper read before the Western Society of Engineers by Mr. J. J. Harding in 1905, with the data used in its design, is given below, and will probably be interesting as showing the method adopted by these pioneer designers in working out their early designs, the great grasp they had of the subject, and the rapid strides made in its manipulation. These data I have worked out more carefully, showing all the steps. This bridge is called "a culvert for a highway undercrossing," and has a span of 20 ft. in the clear, constructed to carry heavy railroad traffic; the details are as shown in the figure.

It was built in three periods, the footings being put in first with short projecting-rods to connect up the second part, *i.e.*, vertical sides, which were erected after the footings had set, and the third period during which the "cover," *i.e.*, the lintel or decking was erected after the walls had set.

Covering the bridge is a depth of 10 ft. of earth, the "cover" being taken as 3 ft. thick (the "cover" is the reinforced slab spanning from side wall to side wall), the extra depth of mortar added at the centre being introduced to throw off the water, and was





An Early American Concrete Bridge.

not considered as taking part in resisting the compressive stresses.

The formula adopted was as follows:—

(1) $y_1 + y_2 = d$.
(2) $y_1 = 0{\cdot}34\,d$ ~ average value as determined by tests.
(3) $y_2 = 1{\cdot}94\,y_1$ ~ from 1 and 2.
F = 54,000 lb. per square inch = elastic limit as assumed for twisted and corrugated bars.
(4) $\frac{a^2 b}{S} = {\cdot}0075\,bd$, or total area of steel is assumed as 0·75 per cent. of the area of the concrete above the centre li e of steel.
(5) $M = \frac{Fa^2 b}{S}\,(y_1 + \frac{2}{3}\,y_1)$ = maximum resisting moment in inch pounds.
Substituting values,
$M = 350\,od^2$.
(6) $d = \sqrt{\frac{M}{350\,b}}$
M = bending moment in inch pounds.

Taking the earth at 100 lb. per cubic foot, and the weight of concrete and reinforcement at 150 lb., the load on 1 sq. ft. of bridge = $10 \times 100 + 3 \times 150 = 1{,}450$ lb. per square foot.

Considering a 1-ft. strip of the bridge the total load = $20 \times 1{,}450$ lb., and the bending moment being for a distributed load = $\frac{WL}{8}$ (L = span in feet and W = total load), we get $M = \frac{WL}{8} = \frac{(20 \times 1{,}450) \times 20}{8} =$ 72,500 ft. lb., which in inch pounds = $12 \times 72{,}500 = 870{,}000$ in. lb.

The maximum live load was taken from tables to be 6,200,000 in. lb. per track, which is assumed as being distributed over 8 ft. at base of rail, and spreading from there to the bottom of the "cover" (a vertical distance of 13 ft. through earth and concrete), at the rate of 6 in. to every foot of depth. Therefore, this load is distributed over 8 ft. + 13×6 in. = 8 ft. + $6\frac{1}{2}$ ft. = $14\frac{1}{2}$ ft. at the "cover."

On the slab taken, which is 1 ft. wide, the bending moment due to live load will be $\frac{6{,}200{,}000}{14{\cdot}5} = 427{,}600$ in. lb.

Taking a factor of safety of three for the dead load and five for the live load, we get $3 \times 870{,}000 + 5 \times 427{,}600 = 2{,}610{,}000 + 2{,}138{,}000 = 4{,}748{,}000$ in. lb., as the bending moment to be allowed for M.

From formula 6, $d = \sqrt{\frac{M}{350\,b}}$ and as b is 12 in. wide, then $d = \sqrt{\frac{4{,}748{,}000}{350 \times 12}} =$ 33·62 in. The area of the steel being taken as ·75 per cent. of the area bd of beam, then as $bd = 12 \times 33{\cdot}62 = 403{\cdot}44$ sq. in., we have 75 per cent. of $403{\cdot}44 = 3{\cdot}03$ sq. in. of steel necessary to take the tension. Three 1-in. bars spaced at 4-in. centres were employed to meet this stress.

The horizontal bars in the "cover" running across the bridge as A, B, and C in the figure were held in position by staples, as shown in enlarged sketch, the staples being fixed in the wooden shuttering, and, of course, remained in the concrete after the shuttering was removed. The $\frac{3}{4}$-in. vertical bars in the walls are 17 ft. 6 in. long, except one every 5 ft., which is 19 ft. 6 in. long, and extends into the "cover" to support the diagonal bars. The other $\frac{3}{4}$-in. diagonal bars in the "cover" D, E, F, G, H, J, K are wired to uprights and used to support the other horizontal and diagonal bars. The bars C and B were bent up, as shown, to assist in resisting shearing stresses as they neared the abutments, but it will be seen that no short vertical members were introduced to take the shearing stresses as they now are in the best present-day practice.

H. S.

THE PLUMBERS' COMPANY.—At a special meeting of the Court of the Plumbers' Company, held on the 19th inst. at the Mansion House, a report from the Company's examiners on the work of indentured apprentices registered by the Company was approved, and awards were made to Nathan C. Myers and William Jarvis (bracketed) and Frank H. Randall (second) for regularity of attendance at technical classes and evidence of progress in practical work. The Lord Mayor (Master of the Company) was in the chair.

THE ARCHITECTURAL ASSOCIATION: VISIT TO ORIENT LINE S.S. "ORVIETO."

A SPECIAL visit of rather unusual character was that to the above liner recently completed and lying at Tilbury. Quite a large number of members made the journey for the purpose of inspecting the interior fittings designed by Mr. A. N. Prentice, and executed by Messrs. H. H. Martyn & Co., The Bromsgrove Guild, and Messrs. Singers & Sons, of Frome. Some of the work had been seen in preparation at Messrs. Martyn's works at Cheltenham during the annual excursion.

The interiors are generally very successfully treated, though any detailed description is useless without illustrations. The principal rooms are the lounge, dining-saloon, music-room, and smoke-room, and though each is panelled and covered by a domed skylight with some plaster enrichment, a pleasing variety of treatment has been secured. The stained sycamore used for panelling the lounge is a particularly beautiful material, silver-grey in colour. It is veneered on mahogany in the panels, and the carving is free Georgian of spirited character. The dining saloon is in mahogany, painted white; the music-room (also mahogany) is restfully painted in grey and white, and the smoke-room is in oak, which has been sand-blasted and slightly waxed. It may be gathered from the description that expense has not been spared, but restraint in design quite prevents any appearance of ostentatious costliness. It was pointed out that the work had been executed at extreme pressure by the various firms concerned.

THE NATIONAL TRUST.

A MEETING of the National Trust was held at the rooms of the Royal Society on Tuesday afternoon, the Princess Louise in the chair. There was a very large attendance.

The first business was the following resolution, moved by Sir Robert Hunter and seconded by Mr. Lionel Cust:—

"That this meeting endorses the appeal of the Council of the National Trust, an appeal which has the support of H.M. The King, for funds to purchase the land now offered for building lying between the Alexandra Gardens and the Curfew Tower at Windsor, in order that the greensward and trees may be preserved and the beauty of the famous view of Windsor Castle from the Thames may thus be saved from serious injury."

Sir Robert Hunter, in his speech, went through some of the principal points which are embodied in the Trust's Report of 1908-1909, printed copies of which were in the hands of the audience. He referred, among other points, to the importance of putting an end to the devastation of Cheddar Cliffs by quarrying, and to their hopes that the two principal landowners, Lord Bath and Mr. Long, would support the Trust in its action; to the gift by Miss Chichester of 50 acres of land on Morte Point, North Devon, to be preserved intact for public enjoyment; to the success which the Trust had had in regard to rendering Derwentwater, both lake and banks, accessible for public enjoyment; to the gift of 70 acres of Leigh Woods, opposite Clifton, by Mr. Wills, which would prevent a beautiful neighbourhood being spoiled by building; and to the purchase which had been accomplished of Coleridge's cottage at Nether Stowey: and he strongly urged the importance of the immediate object of the Resolution, the purchase of the land near Windsor Castle, the trees and open fields on this site forming an important element in the most beautiful view of the castle, which would be entirely ruined by the removal of the trees and the erection of small houses on the site.

The next resolution was the following:—

"That this meeting congratulates the Council of the National Trust upon the progress of the work of the Society, and notes with pleasure the increasing number of properties acquired. The meeting endorses the view of the Council that a larger working income from annual subscriptions is required, and commends the claims of the Trust to the attention of the public."

This was moved by Lord Burghclere and seconded by that veteran upholder of the cause, Miss Octavia Hill, in a speech of real eloquence. Both resolutions were unanimously adopted.

A resolution of thanks to Her Royal Highness for taking the chair, and to the Royal Society for lending their rooms, brought the proceedings to a close.

LONDON MASTER BUILDERS' ASSOCIATION.

THE ordinary monthly Council Meeting was held on Thursday, the 18th instant, when the President (Mr. F. G. Rice) occupied the chair. The meeting was of a lengthy and discursive character, and was protracted till a late hour.

After reading the minutes of the ordinary Council Meeting, held on October 21, and of the special Council Meeting on November 4, the Council proceeded to consider a long and important agenda.

The question of a builder, who is appealing against the decision of an Arbitrator, was considered. The opinion of counsel was read, and a certain course of action decided upon.

On the report of the proceedings of the Organisation Committee a long discussion took place as to the eligibility of subcontractors for associate membership, the same firm frequently trading both as builders' merchants and as subcontractors specified by architects, and therefore exposed to the same attacks as the master builder himself. Under such circumstances, it was considered hardly fair for the builder to have to do all the fighting in the event of a trade dispute, while the subcontractor could stand aloof, and even extend his operations.

It was proposed by some that those who are likely to compete with the builder should give an undertaking to take the same chance as he does and support him in case of need. It was well known how much disorganisation is caused by some subcontractors. They treated the builder as of no account, used his plant, and, indeed, rode rough-shod over him, while the builder had to bear all his annoyances without satisfaction to his general operations, and with little or no profit.

After remarks by Messrs. F. Higgs, J. Carmichael, Wr. Lawrence, jun., Ernest J. Brown, W. F. Wallis, Frank May, Col. G. Haward Trollope, F. L. Dove, the Council agreed that those firms who are specified by architects to carry out work usually done by the building contractor be considered subcontractors.

One firm was elected as ordinary member.

Messrs. R. Woollaston & Co., Limehouse, and sixty-eight associate members were elected.

The President produced his draft of the addition to the history of the Association to be given in the 1910 "Diary and Hand-Book," and the Council approved it.

The question of a trade paper being issued free to every ordinary member of the Association was considered and referred to the Finance Committee for consideration and report.

THE AVERY ARCHITECTURAL LIBRARY, COLUMBIA UNIVERSITY, U.S.A.

IN the letter of gift printed in the introduction to the Catalogue of the Henry O. Avery Memorial Architectural Library (Library of Columbia College, 1895) occurs the following paragraph:—

"It is our wish that the purchases made for the Avery Architectural Library be made exclusively by a Commission of three persons, namely, the Librarian of Columbia College, the Professor or acting Professor of the Architectural Department of the School of Mines, and Mr. Russell Sturgis, of New York, whose successor, in case of his declination at any time, is to be selected by the other two members of the Commission as above, to be always an architect and not immediately connected with Columbia College."

In this way the founders of the Library gave to Mr. Sturgis a controlling position in its management, which was proper, as the conception of a standard architectural library in the City of New York was primarily

his. During the last ten years of his life Mr. Sturgis approved every purchase made from the income of the Avery Fund. Mr. Sturgis's death has left this honourable position vacant. As his successor the surviving members of the Purchasing Committee of the Avery Library, the late Dr. Canfield of the Library, and Professor Hamlin of the Architectural Department, have elected Mr. Glenn Brown, Secretary of the American Institute of Architects, and author of the monumental "History of the United States Capitol." This selection is approved by Mr. Sturgis's friends, and by Mrs. Avery and her son, and will commend itself to all those who are interested in the architectural profession and in the standard architectural library.

The Avery Library, in Columbia University, is the standard collection of the architectural profession in the United States. It is well endowed, and protected by provisions of the letter of gift of the founders. It proposes to include all the best books on architecture. In addition to its architectural books, a large amount of material on subjects of collateral interest has drifted into the collection; works on painting, sculpture, and decorative design in general.

In the Avery collection there are between 18,000 and 19,000 volumes. In addition to this, the University Library possesses in its circulating department an indeterminate mass of artistic material which is probably equivalent to 10,000 volumes. Altogether, the University library contains between 28,000 and 30,000 volumes on various subjects connected with the fine arts. Thanks to the consideration and self-control of its readers, it has been found practicable to make all this material freely accessible to the general public, and especially accessible to the University public.

NATIONAL WELSH WAR MEMORIAL, CARDIFF.

THE illustrations show two of the figures on the National Welsh War Memorial just erected at Cardiff, of which Mr. Albert Toft is the sculptor.

The architectural portion of the memorial, which was also designed by the sculptor, is a Portland stone stele rising from a flight of steps, and surmounted by a figure representing Peace. Of the two side figures, of which illustrations are given, that on the left represents "Warfare," with the significant motto—"Peace on these terms, or war." The other figure represents "Grief." The latter was exhibited at the last Royal Academy, and was one of the best pieces of sculpture of the year. On the front of the pedestal is the inscription:—"To the memory of the Welshmen who fell in South Africa, 1899-1902. Erected by public subscription."

Architectural Societies.

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

The annual Conversazione of the Architectural Association, held last Wednesday evening, passed off with even more than the usual success. The Octagon Hall at Tufton-street was gaily decked out for the occasion. Refreshments (by Messrs. Harrods', Ltd.) were served on the ground floor. Round the walls of the first-floor gallery, where the President, Mr. Henry Tanner, received the guests, were hung the exhibits of the Camera and Sketching Club. The photographs shown were technically almost perfect. Among the sketches we noticed in particular the water-colours of Mr. A. Douglas Robinson; Mr. A. Snow's Caudebec sketches deserve special remark, as also Mr. T. C. Andon's studies of shipping, which are uncommonly truthful. In the lecture-room were hung a collection of water-colours and drawings of more than ordinary interest, including several works by the late Mr. Fulleylove, kindly lent for the occasion by Mrs. Fulleylove. The Corporation of the City of London lent the remarkable series of drawings of Old and New London Bridge, by E. W. Cooke, a veritable artistic treat; their fidelity and delicacy is marvellous. The etchings which Cooke made after them are comparatively well known; the sight of the original drawings was to us not the least enjoyable feature of a well-spent evening. Another notable loan was Mr. Axel Haig's drawings of William Burges's scheme for the decoration of St. Paul's Cathedral. Chief among the other exhibits in this room were Mr. Ernest George's water-colours. "The Rialto" is a fine impression, though some may prefer the more romantic qualities of the view of "Limburg." Mr. Leslie Wilkinson's drawing of the west doorway of S. Trophime at Arles was perhaps the best example of his work to be seen on the walls. Drawings of Penshurst by the late George Devey deserved inspection. The top-floor gallery was hung with examples of the work of the students; some of the first-year work is of surprising excellence. Pitman's Blue Viennese Orchestra supplied a musical setting to the proceedings, while in the lecture-room members of the Architectural Association Musical and Dramatic Society sang in chorus and quartette.

LIVERPOOL ARCHITECTURAL SOCIETY.

The first members' meeting of the session was held on the 15th inst. in the rooms of the Society, 13, Harrington-street, when Mr. F. E. G. Badger (Liverpool Deputy Building Surveyor) read a paper on "Reinforced Concrete and Steel-frame Buildings," illustrated by lantern slides and drawings. The chair was occupied by Mr. E. P. Hinde, Vice-President. A "frame-building," the lecturer explained, was one where all the loads on each individual floor, including the outer walls, were transmitted to the foundations by means of beams and columns. To the proper development of that method of construction the building regulations in force in the principal towns in the United Kingdom had been a great obstacle, but a reformation was taking place, and many towns had followed in the footsteps of Liverpool and obtained Parliamentary powers to relax or modify the provisions of the building regulations. With regard to material, the lecturer said that unless proper precautions be taken steel had two very undesirable characteristics. First, a loss of effective area of metal, due to oxidation; and, secondly, complete inability to sustain itself when subjected to the temperature of ordinary fires. If the steel is properly encased, say, in concrete or cement, it would serve the double purpose of protection from fire and oxidation, as cement is well known to be one of the best preservatives of steel. In that case, the steel must not be painted or oiled, as the cement would not adhere. It was, however, reinforced concrete that would occupy attention in the future. Our cousins across the Atlantic had to a great

Warfare.

Grief.

Sculpture from the Welsh National War Memorial, Mr. Albert Toft, Sculptor.

extent been the cause of the comparatively slow development of reinforced concrete in this country. If shavings and pieces of wood are carelessly left at the foot of a column and concreted up, they could not expect anything but disaster. Another cause of delay in the acceptance of reinforced concrete as a method of construction had been due to the fact that one effect of our changeable climate on a large superficial area of a reinforced concrete building is the cracks which were visible in the thin walls, and these, unfortunately, had given rise to alarmist reports by irresponsible persons. The first advantage attaching to reinforced concrete construction was economy, and other advantages were strength and capacity to resist fire. A vote of thanks to the lecturer was proposed by Mr. W. E. Willink, and seconded by Mr. Hastewell Grayson. In the discussion Professor Reilly, Mr. Alexander (City Building Surveyor), Mr. S. R. Surtees, and Mr. A. C. Ardern took part.

EDINBURGH ARCHITECTURAL ASSOCIATION.

A lecture on "A New Theory of Proportion Applied to the Façades of Grecian Temples" was delivered by Mr. G. S. Aitken, architect, to the Edinburgh Architectural Association on the evening of the 17th inst. After allusion to Vitruvius and to the work done by Sir James Pennethorne and Mr. Penrose on the optics and refinements of Greek architecture, and to the system of proportion formulated by Mr. Watkiss Lloyd, reference was made to Mr. D. R. Hay's labours in the middle of the XIXth century, and Professor Kelland's approval of them. It was found, however, that Mr. Hay's interesting theories did not accord with the facts of the Parthenon to which he applied them. A solution was sought in a letter of Sir Isaac Newton, where a remark about the sides of polygons quadrating with rectangles furnished a workable basis. The remainder of the lecture was devoted to this, and took the form of applying the angles of 60° and 30° which arose out of the hexagon, and of 67½°, 45°, and 22½° furnished by the octagon to a series of thirty-one Greek temples, in which it was shown that they could all be built up from the given basal line of the upper step of the stylobate by using these angles or combinations of them with arcs of circles to determine the heights of the columns, and of the entablatures and pediments. The Theseum, for instance, is worked out by employing an angle of 22½° for the lower part, and of 30° for the upper part of the façade. A divided line of 60° fixed the diameter of the columns, and intersecting angles of 45° and 30° determined the depth of the stylobate. The application of the angles varied according to the effect which the Greek architect desired to produce. It was pointed out, in conclusion, that the use of the law which regulated the design of the Greek temples would be to the æsthetic advantage of modern architecture, and that successful acoustics depended upon the acknowledgment of it.

MANCHESTER SOCIETY OF ARCHITECTS.

The annual dinner of the Manchester Society of Architects was held on the 17th inst. at the Midland Hotel, the President, Mr. P. S. Worthington, presiding. There were present Mr. Ernest George (President of the Royal Institute of British Architects), the Lord Mayor of Manchester (Mr. Behrens), Mr. A. Hopkinson (Vice-Chancellor of Victoria University), Professor Capper, Mr. Isaac Taylor (Hon. Secretary), Mr. W. Cecil Hardisty, Mr. Edgar Wood (Vice-Presidents), and others. The President, in proposing "The Royal Institute of British Architects," spoke of the work accomplished by the Institute during the last twenty years. This year the number of Fellows of the Institute was 888, Associates 1,338, and students 466, whereas twenty years ago there were only 466 Fellows, 723 Associates, and no students. In the matter of members the Institute was clearly flourishing, and becoming more and more representative of the profession throughout the country. In Manchester their numbers had increased to perhaps an even greater degree. With the extension of the Institute the provincial societies would be largely represented, and the Institute would take into consideration the problems which provincial societies had to deal with. With that stronger position and with the appreciation which he thought was shown by the public to architecture, they might assume that architecture would take its place among the arts more than in the past. Mr. Ernest George responded.—The "City of Manchester" was proposed by Mr. Paul Ogden, and replied to by the Lord Mayor, Mr. Behrens, while Mr. Roger Oldham proposed "The University of Manchester," and Vice-Chancellor Hopkinson replied. Mr. S. F. Butcher, President of the Manchester Law Society, responded to the toast of "The Legal Profession," submitted by Mr. A. J. Murgatroyd.

NORTHERN ARCHITECTURAL ASSOCIATION.

A meeting of the students of this Association was held last week when Mr. J. G. Smith read a paper on "Portland Cement Manufacture and Testing." After giving a brief outline of the history of its manufacture, Mr. Smith dealt with the great progress made in recent years in the grinding of cement, his remarks being accompanied by practical demonstrations of passing cement through a sieve of 32·400 holes per square inch. The lecturer also described the expansion test which has been welcomed by manufacturers, who see in its adoption the more equal consideration of a cement whose strength is progressive, and one which, while giving a superior result on the seven days' tensile test, deteriorates afterwards. During the evening students were afforded an opportunity of examining a testing machine, a number of briquettes being tested for tensile strength.

Archæological Societies.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

The opening meeting of the Session was held at 32, Sackville-street on the 17th inst., Mr. R. H. Forster in the Chair. Mr. Emanuel Green read a paper on Somerset Club Brasses, and pointed out that the custom of carrying a rather large ornament of brass on the usual club staff of the village friendly society was apparently peculiar to that county. Several examples were exhibited, and these, which were for the most part of an armorial character, are now somewhat scarce and difficult to obtain.

Engineering Societies.

ENGINEERING AND SCIENTIFIC ASSOCIATION OF IRELAND.

At a meeting of this Association last week Mr. A. W. Brown read a paper on "Mill and Factory Chimney Construction." He said brick was the best material for chimneys. Steel chimneys were going out of favour because of the inferior draft capacity, high maintenance costs, short life, and difficulty of repair. Ferro-concrete chimneys had not been a great success, owing, no doubt, to temperature difficulties. Further, the ordinary difficulties of construction were serious. When they considered that the range of temperature might run from 1,200° Fahr. to 300° Fahr., it was only to be expected that trouble would arise in ferro-concrete chimneys. Formerly the construction of factory chimneys was in the hands of architects; now most large or important chimneys were designed by specialists. The following points must be considered:—(1) When the chimney is to be built; (2) the purposes for which it is to be used; (3) the amount of heat to be dealt with. In chimney construction, given a certain size, the first problem was to design with least materials to give stability, *i.e.*, to build at lowest cost. If ordinary square bricks were used, bonding was poor, waste was great, and the chimney must be square, otagonal, or hexagonal. The speaker then went on to describe two chimneys, one octagonal and the other circular, and gave the following particulars. The chimney to be 200 ft. high, 6 ft. 6 in. internal diameter at top, to be built of perforated bricks, and to withstand a gale of 100 miles per hour; maximum stress at lee edge not to exceed 15 tons per square foot; maximum load on foundation due to dead weight not to exceed 12 tons per square foot; firebrick lining to be 55 ft. high; flue inlet 9 ft. by 4 ft. at ground level. The author then proceeded to go into the detail of design of the two chimneys, showing that the circular chimney was 25¼ tons less dead weight, and was a much stronger erection.

METROPOLITAN ASYLUMS BOARD.

At the fortnightly sitting of the Metropolitan Asylums Board on Saturday last week the following matters were dealt with.

Accommodation for Motor Vehicles.—A letter from the Local Government Board was received approving of the plans relating to the provision of accommodation for motor vehicles at the Eastern and South-Eastern Ambulance-stations.

Cleaning and Painting Works. — The Hospitals Committee reported having forwarded to the Works Committee for their observation and suggestions, schedules of the cleaning and painting works and repairs which it was proposed to carry out at the infectious hospitals and wharves during 1910, and it was agreed that such painting and cleaning works as might be authorised by the Committee should be carried out either by direct labour or by contract, as they might determine after consultation with the Works Committee.

Caterham Asylum.—The Local Government Board having approved of an expenditure not exceeding 845*l.* on the work of converting into infirmaries the three floors of block E on the female side, of block F on the male side, and the ground and top floors of block D on the male side of Caterham Asylum, the Works Committee reported having, on the recommendation of the Chief Engineer, authorised the works being carried out by temporary labour under its supervision.

Darenth Asylum.—It was agreed that Messrs. Aldwinckle & Son be appointed as architects in connexion with the erection of additional workroom accommodation at the Darenth Asylum, at a commission at the rate of 5 per cent. on the total cost of the works.

Additional Buildings at the Children's Infirmary.—A long report was submitted by the Children's Committee on the successful result of the experiment of utilising the Southern Hospital for the treatment of sick, convalescent, and debilitated children, and a number of recommendations were made for increasing the accommodation by providing additional buildings. The proposals include the provision of isolation wards and school buildings for the patients, extra staff accommodation, the installation of a heating system, and the repair of roads. The recommendations were that the Works Committee be asked to prepare plans and estimates for the work. For the repair of the roads the estimate was 3,570*l.*

Professor Smith moved that the report be referred back, on the ground that the report had only been before them forty-eight hours, and they had not had time to consider proposals which he understood would cost something like 50,000*l.*

Mr. Lile seconded the reference back.

Mr. Eckroyd pointed out that the adoption of the recommendations would not really commit the Board to any expenditure.

Mr. Lower said that they would have to spend 10,000*l.* on heating even if the other proposals were not carried.

The amendment was defeated on a division.

After considerable discussion the recommendation for the provision of a hall and schoolrooms was referred to the General Purposes Committee, and the other recommendations were adopted.

INTERNATIONAL EXHIBITION OF FINE ARTS, VENICE.—The municipality of Venice has decided to hold the ninth Fine Arts Exhibition in the course of May next, instead of in the spring of 1911. The arrangement is made in order that the exhibition shall not clash with that which will be held, in 1911, in Rome.

NOVEMBER 27, 1909.

TO CORRESPONDENTS.

"RUSTIC" (should have enclosed name and address).
E. A. R. & Co. (next week).

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All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

All drawings sent to or left at this office for consideration should bear the owner's name and address on either the face or back of the drawing. Delay and inconvenience may result from inattention to this.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

N.B.—Illustrations of the First Premiated Design in any important architectural competition will always be accepted for publication by the Editor, whether they have been formally asked for or not.

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"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the prepaid rate of 19s. per annum, with delivery *by Friday Morning's Post* in London and its suburbs.

To Canada, post-free, 21s. 8d. per annum; and to all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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MEETINGS.

MONDAY, NOVEMBER 29.

The Royal Institute of British Architects (Business Meeting).—The following matters will be brought before the meeting:—By Mr. Wm. Woodward: (1) The London County Council's General Powers Bill, 1909, and the note thereon on page 643 of the *Journal* for July 24, 1909; (2) architects' responsibility in connexion with dry rot in buildings; (3) the necessity of assessors in competitions adhering strictly to the cost limits laid down by promoters; (4) the advertisements of "stores" and other firms as regards the employment of establishment architects; (5) the advisability of admitting reporters to our business meetings; (6) to inquire what has been done by the Council in connexion with the proposed new bridge over the Thames.—By Mr. G. A. T. Middleton: (1) To move that reporters shall be admitted to the meeting; (2) to introduce to the consideration of the Institute a suggested Registration Bill for Architects, and to move its adoption by the Institute clause by clause. Mr. E. Greenop: To call attention to the unsatisfactory position of the present Institute schedule of charges, and its inadequate provisions for many of the circumstances arising in daily practice, and propose a resolution. 8 p.m.

London Institution.—Mr. H. Beaumont on "An Architectural Journey from Noyon to Rheims." Illustrated. 5 p.m.

TUESDAY, NOVEMBER 30.

The Institute of Sanitary Engineers (Students' Lecture).—Mr. H. W. G. Macleod, B.Sc., on "Water and Water Supply." 7 p.m.

University Extension Guild (British Museum).—Lectures on Ancient Architecture, by Mr. Banister Fletcher. IX.—"Greek Architecture. IX.—The Parthenon, Athens." 4.30 p.m.

Carpenters' Company University Lectures (University of London).—Mr. Halsey Ricardo on "The Renaissance of Architecture in Italy"—VII. 6 p.m.

WEDNESDAY, DECEMBER 1.

Edinburgh Architectural Association (Associates' Meeting).—Mr. A. Pordage, Firemaster, on "Effects of Fire on Fire-resisting Construction." 8 p.m.

Society of Arts.—The Hon. R. C. Parsons, M.A., on "Resilient Wheels for Vehicles." 8 p.m.

Institute of Sanitary Engineers.—Mr. R. Horton on "Petrol Air Gas Lighting." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, DECEMBER 2.

Builders' Benevolent Institution.—Sixty-second annual dinner, Whitehall Rooms, Hotel Metropole, Charing Cross. 6.30 p.m.

FRIDAY, DECEMBER 3.

Glasgow Architectural Craftsmen's Society.—Mr. A. Smith on "The Restoration of a Newfoundland Cathedral." 8 p.m.

Institution of Mechanical Engineers.—An extra meeting, when the discussion will be resumed on Mr. Herbert A. Humphrey's paper on "An Internal-Combustion Pump, and other Applications of a new Principle." 8 p.m.

SATURDAY, DECEMBER 4.

Edinburgh Architectural Association. — Associates' morning visit to Messrs. A. Ballantine & Son's Glass Staining Works, 42, George-street.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 26, 1859.

COMPETITION DRAWINGS.

THE motto system, even in the point of view of the objects of the promoters of a competition, has been shown to be not merely useless, but prejudicial; and in the present case, the stipulation that the motto should not be in the author's handwriting has been, equally as usual, inefficacious for concealment. Some of the best designs are at once to be referred to certain authors, from treatment and character, and the manner of drawing; and in others, the same mottoes, and, we think the same handwriting, are used as were appended to designs, obviously of the same authorship, which were reported upon by us at Westminster, Manchester, or elsewhere. The identification is assisted by the description of mounting, and that in spite of the careful prohibition by the committee at Cambridge of "ornamental margins." The system, simply, gives prominence to some competitors, and does not give to others that which may be their due by merit. It is retained because committees, not aware of the objection to it, are under the idea that it is consistent with fairness, and is acceptable to architects. We trust, however, if competitions are to be continued, we may shortly be able to speak of the use of mottoes as merely optional. It may be said the effect would be to direct attention to designs by architects having a reputation. But, with professional assistance in selection, we do not think that would be the objection; whilst, without such assistance, we are prepared to show, not merely the objects of committees, but probably those of the profession generally and of each architect, would be better served had the name and experience of an individual just so much weight as a committee are compelled to place in the balance when they come to actual building—so much as will constitute a design something more than a picture—a mere unacted drama—a *vox et præterea nihil*. The whole, however, adds to the argument otherwise in favour of the professional assistance.

*** The above quotation shows that we argued in favour of the appointment of a professional assessor a quarter of a century before the idea came into practical working.—ED.

Illustrations.

SOUTH TRANSEPT, WESTMINSTER ABBEY.

THIS fine and complete set of measured drawings of the end wall of the South Transept of Westminster Abbey is by Mr. C. A. Bassett-Smith. We have had the drawings lithographed for some time, but reserved their publication for some occasion when they would have a special reference to an article on the paper. As we are reviewing this week Mr. Bond's new book on Westminster Abbey, they come in fittingly as contributing an important illustration of the subject.

The wheel window is a restoration, but otherwise this is a record of English mediæval work of the finest type; and the plans of each story, and the numerous sections of mouldings, provide a very complete illustration of the architectural structure of the design, and our readers will no doubt join in our thanks to the author of the drawings for enabling us to publish them.

THE SURVEYORS' INSTITUTION:
TOWN PLANNING SYSTEMS.

AN ordinary general meeting of the Surveyors' Institution was held on Monday, at No. 12, Great George-street, Westminster, S.W., Mr. A. Rose Stenning, President, in the chair, when a paper was read by Mr. W. R. Davidge on "Town Planning Systems."

Mr. Davidge, who showed a number of interesting lantern views and plans, said London owed something to the Great Fire, and might have owed much more had the rebuilding been carried out in the way Wren and others would have had it; and it was instructive even now to compare the schemes proposed by John Evelyn and Sir Christopher Wren for the rebuilding of London. Vienna, Paris, and Berlin were all indebted to the sacrifices, and often to the sufferings, of the past, and it was possible that the development of these cities would not have been so complete or so satisfactory had they been constructed at their earliest inception on the lines of some general plan instead of by the troublous and slow development, piece by piece, they had been forced to follow. Town planning, as we know it, was but a development of the best points in existing systems, and their adoption to a greater or less extent to the special requirements of the particular community. With the exception, perhaps, of the newer parts of Edinburgh, Eastbourne, Bath, and one or two smaller towns, very little definite planning had been carried out in Great Britain; but the subject was a living one, and it behoved us to profit to the utmost of our powers by the experience of continental and other nations who had adopted previous systems of town planning.

The author then considered some German examples, and remarked that town plans, whether complete or only partially so, would generally resolve themselves into one or other of the following, *i.e.*, rectangular, triangular, radiating (constituting the formal systems), and irregular or picturesque school, with variations made up from the use of several or all of these systems.

He then dealt with these systems at some length, giving a number of illustrations, and then spoke of provision for future development. Speaking of irregular outlines, he said that modern requirements demand that the streets shall be of ample width, and there could be no two opinions that the tree-planted street with its welcome shade and refreshing greenness was to be preferred to the narrow street of the older type or to the barren and scorching wilderness of dust or paving which was unfortunately so often typical of the modern city. It sounded almost sacrilege to say it, but it was just possible that our Building Acts and by-laws might be in some way a mistake, that our rigid enforcement of building lines and regulations apparently aiming at establishing a perfectly straight unbroken expanse of blank wall—miles of it—without a projection of any sort if it could be avoided, might be misguided.

In laying out a new town or portion of a town the necessities of the future would naturally have precedence over all other considerations, and due regard must be given to:—

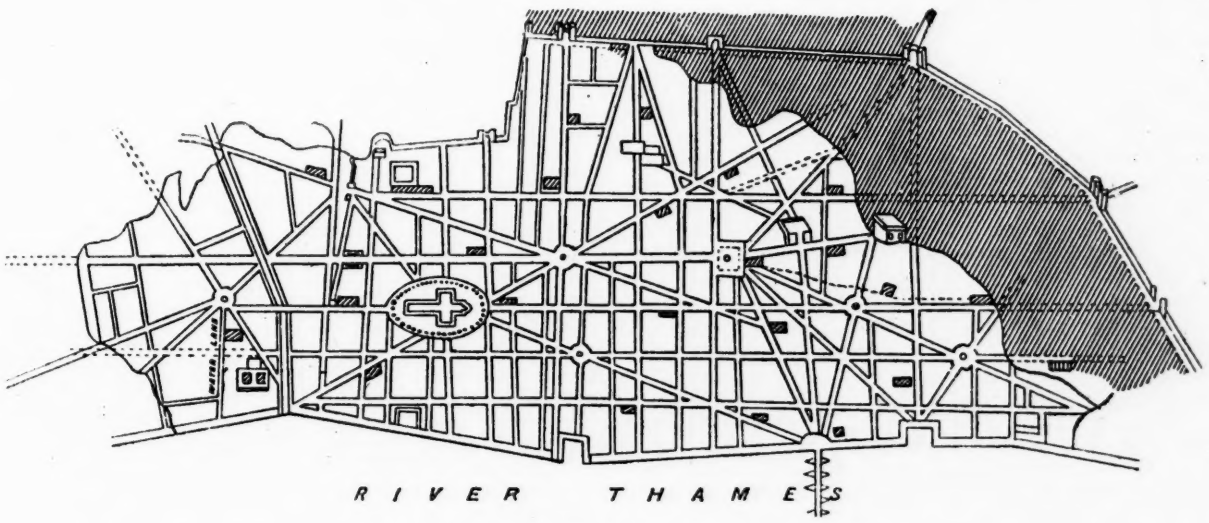
1. The lines and widths of main routes and directions of principal subsidiary streets, having regard to prevailing winds, traffic requirements, preservation of views, etc.
2. Public buildings to be provided, churches, schools, public halls, theatres, baths, libraries, post-offices, municipal buildings, and such-like—their number and probable size.
3. Open spaces to be provided for
   (*a*) Playgrounds, parks, and recreation grounds;
   (*b*) Public squares, having regard to probable extent and grouping of public buildings, monuments, etc.
4. Districts to be reserved for factories and dwellings, and zones for limits of heights of buildings (if any).

In considering the difference between English and German conditions, he said that the above considerations and any others dictated by special local circumstances should naturally be taken into account in any plan

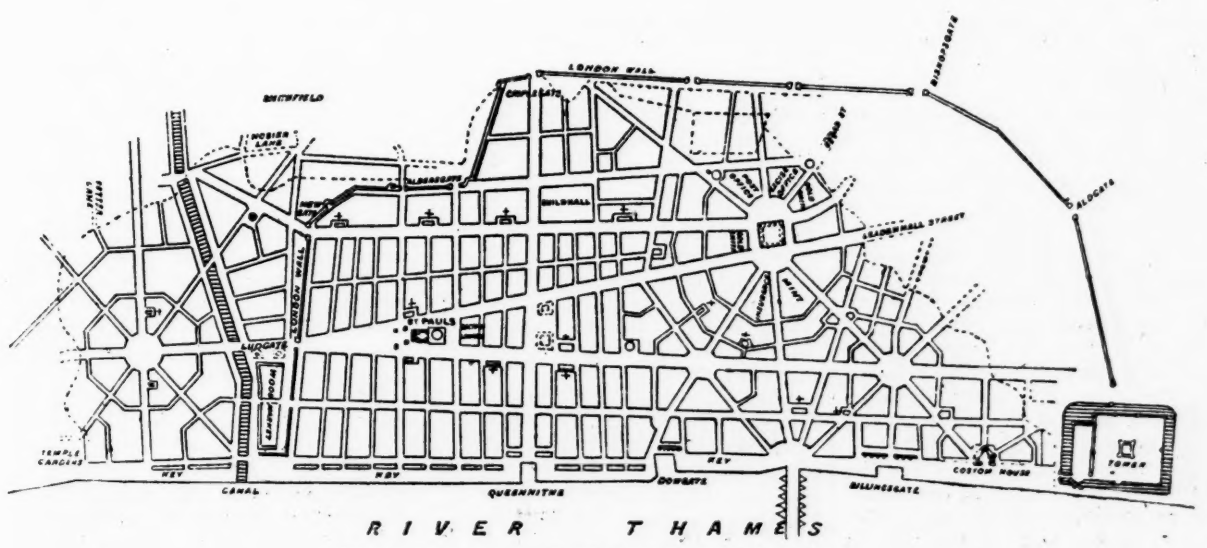
for town extension. In our own country the Englishman's house was, at any rate in theory, still his castle, and the ambition of the thoughtful artisan or other worker was to occupy a cottage pleasantly situated in the country or in the outskirts of the town in which his work lay. In Germany it was the rule rather than the exception for the artizans' dwellings to be of the tenement type, and, despite other improvements, overcrowding in that sense was much more rife even than in England. It followed from this fact that the population was much less closely housed in this country, that our English cities, and particularly their suburban districts, occupy a much greater area than a similar population would require in Germany. The problem of development was thus if anything a more complex one, and any schemes for town planning should provide for future development in a much more expansive way than was necessary with our neighbours. The throwing down of the town walls and fortifications within comparatively recent times in many continental cities had given an opportunity for a belt of public grounds or broad tree-planted boulevards within comparatively easy reach of the centre. The ducal or autocratic control so common in many of the German cities had also to a large extent enabled the problems of town development to be undertaken on comprehensive lines and on broad principles. We in England had no town walls to demolish and we were not under such autocratic sway. The great ground landlords of many of our large towns could nevertheless do much for the public good in this direction if they would but unite forces with the representative local authorities of their districts. We had nevertheless other compensating advantages for the purposes of town planning in the larger area and more convenient proportions of our enclosures, and, as a rule, in the fewer number of owners with whom negotiations must be opened. The cottage dwellings and other two-story buildings so usual in this country also rendered unnecessary in the majority of cases any special legislation or regulation, so common in Germany, for limiting the height. Fresh air and prevailing winds alike found easy access to dwellings under such conditions if sufficient open space was provided around the buildings. But the density of population allowed or rather encouraged by our present model by-laws might be anything up to 300 or more per acre for even our ordinary two-story cottages, and it would certainly seem advisable that some improvement in the amount of the private open spaces to be provided, as well as those of a more public character, should go hand in hand with any scheme worthy of the name of town planning.

Modern traffic requirements demanded that all parts of a city shall be accessible to rapidly-moving vehicles and, particularly since the advent of the motor, the idea seemed to be general that these streets should be as straight as a dart. The widths to be provided for the various classes of streets were of the utmost importance, and the possible direction of future lines of route should as far as possible be anticipated. The lesser subsidiary streets would naturally be planned in each case with due regard to the contour of the ground, direction of prevailing winds, access to railway-stations and other points, and the question would have to be considered whether a straight or curved street was to be adopted. The cost of making up streets, macadamised or paved the full width, was considerable, and it would in many cases be cheaper and more effective to make up only the width necessary for the actual traffic, leaving grass margins at each side. Broad straight thoroughfares were naturally best adapted for monumental avenues leading directly to some national or civic building of sufficient importance, and possibly it might also be added for main through roads conducting one to important towns. It was at least questionable, however, whether long straight streets did not lose much of their effect if constructed in too great profusion, and without any special objective. Such an avenue should have some special *raison d'être* to justify its existence, and it should terminate in something more inspiring than a dust destructor or a house of refreshment. The typical irregularity of the streets of nearly all old cities was attributable to their gradual historical development, and their sometimes astonishing twists and turns might generally be ascribed to practical causes, such as the presence of an ancient way or watercourse. But it must be borne in mind that the irregularities of a plan which looked so strange on paper were not necessarily disagreeable in actual execution, but often gave an added interest or more picturesque effect to the street. Regularity of plan was by no means essential.

With streets as well as with squares it was frequently desirable to frame or limit the view, and this was most generally achieved by forming a break or curve in the line of sight; the junction of Regent-street with Portland-place would serve to exemplify this, and the construction of quadrants and curved façades was another expression of this general feeling. With a strongly-marked curve (such as the quadrant in Regent-street) there might possibly be a tendency to irritation if the length was unnecessarily prolonged, but with a slightly



Evelyn's Plan for St. Paul's and its Neighbourhood.



Wren's Plan for St. Paul's and its Neighbourhood.

curving frontage there was ample opportunity for a continually varying horizon, for a moving picture of continual charm. This was particularly the case where numerous objects or buildings of interest existed on the same line of route. For a tree-planted street, a slightly curved line not too regular in form gave perhaps the most pleasing effect, and for suburban streets in particular this method of planning with its continual green vistas of trees was worthy of the utmost encouragement. The most successful of the garden suburbs had in many cases been designed on such lines—a maximum of garden, a minimum of suburb. Even in this case, however, the curved streets should not be overdone. Nothing was more bewildering to a stranger than to find himself in a labyrinth of streets curving in every direction except that in which he wished to go. In a town street a curved or irregular line of frontage might be made to provide just the spaces for cabstands, sandbins, public ambulances, telephones, fire escapes, fire calls, and the other conveniences which were so essential to the comfort of life in a modern city. In a less crowded street the continual change of view, due to the irregular frontage, helped to break the thoroughfare up into short sections; the foot traveller felt conscious as he passed landmark after landmark on his way that he was indeed making good progress, and pressed forward with encouragement, very different to the unfailing weariness produced by a mile of straight road both on mind and body. In modern towns irregularities of planning had not perhaps always been a success, their artificial character was too apparent, and in many cases the irregularities were simply cut-away plots of triangular shape produced in connexion with street improvements, or perhaps due to the parallel shape of plots forcing the houses into *echelon* formation. The crooked street of our forefathers was perhaps too crooked for modern ideas, but it should at any rate be possible for us to grasp some of the principles which consciously or unconsciously must have guided the men of the past. With the advance of sanitation and the increase of traffic we demanded wider streets and more breathing space. Straight streets were undoubtedly necessary for many purposes; if wisely used they gave an air of stateliness and a sense of fitness and monumental grandeur; but the so often reiterated use of the rectangular or draught-board pattern of street planning, without consideration to the shape or contour of the ground or to any other local circumstance could not but be regretted.

The lecturer then referred to the question of traffic centres, and in this connexion he noted the suggestions recently made in a Report upon the street traffic of Paris. The suggestion was not so much a constructive one as for the regulation of existing traffic, and to enable two or more streams of traffic to cross at any angle without confusion. It was suggested that at important street junctions circuses should be formed with a central island of some size, the traffic being made to circulate solely to the left, or in one direction only. Some such system of traffic regulation was at any rate worthy of a trial, and with the assistance of the London policeman should not be difficult to carry out. The main drawback appeared to be that traffic proceeding from one road to another immediately on the right would have to make almost a complete circuit of the space. It might be advisable, also, in cases of any heavy traffic to provide subways or other facilities for foot passengers. The French proposal suggested that the central space might be entirely open at a level of about 10 ft. below the street, short subways being constructed from this to staircases at the various street corners.

Parks must always be provided for the public, and these should be in as easy communication as possible with the most congested portions of the town. It was not too much to say that public gardens or tree-planted spaces were a vital necessity for the health and well-being of the community, and there could be no question that the beauty of a town was greatly enhanced by the presence of a sufficiency of trees and well-kept gardens. Ample space should also be provided for the purpose of playgrounds for the children, and these should be of a pleasant character and something more than gravel or asphalt wildernesses. A point that was not always borne in mind in designing squares or open spaces was the proportion which the space should bear to the surrounding buildings, and particularly to the dominating building which was to abut upon it. The charm of the older cities was in hardly any case obtained by the use of large open spaces; their pleasing result was attained by a judicious grouping or arrangement of comparatively small spaces. Sitte, who had made a close study of a large number of mediæval and other towns whose charm was undeniable, stated that in front of a building such as a church of considerable height in proportion to its breadth, in which the vertical note predominated, the place or open space should be *deep* and narrow, while in front of a long façade such as that of a town hall or other building of considerable length the open space should be *wide*, rather than deep. Experience showed, he said, that the minimum dimensions of a place should be equal to the height of the principal edifice fronting thereon, and that its maximum dimensions ought not to be more than double such height.

As to the possibilities for London, the first necessity was for co-ordination of effort among the many authorities in whose tender mercies the hapless Greater London was situated. Some such co-ordination should be possible under the direction of a central authority invested with sufficient powers. Given such co-operation, the next thing was evidently to take stock of our present advantages—our parks, open spaces, watercourses, commons, country lanes, and main highways, and to make all such assets as accessible and convenient as possible. Of Garden Suburbs we had already a few, but they needed to be increased in all directions. In parks and open spaces London was apparently well provided, but many of these were concentrated in the better-class neighbourhoods, and whole tracts of bricks and mortar still existed with hardly a tree-planted street, and only an occasional spot of green grass in the shape of a disused burial ground. Areas which might be utilised as public parks were steadily absorbed by factories and rows of mean streets, each individual owner naturally striving to make his land return as much as possible by crowding the bricks and mortar as closely as Building Acts would allow. Apart from the question of improving and widening many of the existing roads out of London, and of providing new routes where necessary, one of the first considerations should undoubtedly be to bring the larger parks and as many other green open spaces as possible within easy reach of all sections of the community. A broad boulevard or ring strasse might be formed, somewhat on the lines that have made Vienna and other cities so magnificent. The suggestion would provide for the connecting of the principal parks by a broad tree-planted avenue, with green grass and gardens at frequent intervals. Imagine the improvement effected if Hackney Marshes, for example, were transformed from a plain bare wilderness of parched grass with straight ugly canals, into a veritable Bois de Boulogne intersected by beautiful waterways. We did not make half enough of our present assets and with expert assistance there would be innumerable fields for the beautifying of London. The Regent's Canal was in many places one of the most beautiful of London's ways, but it meant little, if anything, to the thousands of Londoners who caught but a glimpse of it from the top of an omnibus over the parapet of a high-walled brick bridge, or through the chinks of an advertisement hoarding. What a glorious series of shady walks might be made by its banks with a little thought, a little sacrifice! Very few great cities were more finely situated by nature than London, if we could but realise it. Both on the north and south it was girdled by hills, and the broad expanse of heath at Hampstead and the hills of Sydenham and Forest Hill were splendid fringes for a splendid city. On the east and west we had already an almost continuous chain of truly beautiful parks, and yet the main roads lined closely on each side by houses in many cases thread their way through the closely-built area between the parks, almost within reach, yet entirely out of touch with the green grass and green fields. The remedy was clearly to open out all such parks so that they could be appreciated and utilised to the fullest possible extent.

No planning, however, could hope to be of real service in beautifying our cities unless the architecture of the buildings was in accord with its needs and worthy of its purpose. Some efficient architectural control there must be, but at the same time it was evident that in England at any rate as free a hand as possible should be given to individual tastes. With our present methods this might appear well-nigh impossible, but with a better and more general appreciation of the art of building it would not be an impossible ideal to reconcile these conflicting schools. Although perhaps in the central and more important areas it might be necessary to require buildings to be to a strictly regulated and restrained design, in the outskirts there was no reason why much more latitude should not be allowed for individual ideals. The garden suburbs, which had been formed in various places around our great cities, were many of them delightful in their planning and surroundings.

The lecturer, having referred to town planning authorities, gave a brief summary of the conclusions to which one was led:—

1. Each town must have an individuality of its own.
2. Natural assets, such as hills, woods, and water, must be preserved and extended.
3. Main lines of route must take direction required by traffic and contour of ground.
4. Geometrical planning must not necessarily be adopted as satisfactory.
5. Long straight streets, when adopted, should have a definite motive.
6. Slight curves or irregularities in frontage lines might, in many cases, be adopted with advantage.
7. Line of sight should, in most cases, be restricted within reasonable limits, *i.e.*, lines of long streets, except as mentioned above (No. 5), should be broken, and all views should as far as possible be framed in a suitable setting.
8. The grouping or arrangement of the principal buildings and open spaces should in all cases be specially studied with a view to securing the best effect for the whole.
9. No planning scheme could be considered as complete without a sufficiency of open spaces, and due regard must be paid to proportion and to architectural design.

Mr. Leslie Vigers, in moving a vote of thanks to the lecturer, said it was a great pity that Wren's principle of rebuilding London had not been carried out, and they could not help feeling that Wren's mind went far beyond his time. The general tendency of legislation was far too much in the direction of concentration in the hands of Government Departments and Borough Councils, and that was very much the case in regard to the Housing and Town Planning Bill. We were bound too much by the theories of men who happened to be in office and with no means of getting outside what they enforced. And we suffered, to some extent, from what he would call the 2-ft. rule reading of the Building Acts, though in that particular case there was the right of appeal to the Tribunal of Appeal, consisting of men of experience and of independent mind; but still there was too much of this 2-ft.-rule way of carrying out the Acts. He had the greatest sympathy with garden city associations and companies in the work they were doing, but he did not think we had got the people up to a condition to appreciate what was being done. As to streets, he thought that the breaking-up of the roof line of streets was a great advantage from an architectural

point of view, and the greatest advantage was the breaking-up of the circulation of the air.

Mr. Henry Lovegrove seconded, and said he had visited many of the places on the Continent referred to by the lecturer, and he had always been struck by the fine open spaces and the splendid arrangement of the streets in many of those places. We did not get chances of planning new towns, but we had to deal with the enlargement of existing cities, generally, in which were factory chimneys and miles and miles of dreary streets. Bath always struck him as a particularly well-designed and planned city. Many picturesque cities on the Continent grew up accidentally, so it seemed to him, but what would happen to them in the event of a fire, especially to a city like Berne? Mr. Davidge's scheme for connecting the parks was a fine one, but had he thought of the poor ratepayers? The tendency of the present day was to take the people away from the centre of London right into the country, which was a very good thing in one way, but it interfered with the trade of London.

The President said they were to have a paper on January 10, by Mr. Wilmott, on the "Housing and Town Planning Act," as he called it, and it was proposed to adjourn the discussion on Mr. Davidge's paper and to take the discussion on the two papers on January 24.

The vote of thanks having been agreed to, Mr. W. Woodward moved the adjournment of the discussion, and, this having been agreed to, the meeting concluded.

The next meeting will be held on December 6, when a paper will be read by Mr. C. P. Hall on the subject of the "Direct Payment of Rates."

ST. MARGARET'S HOSPITAL, WIMBORNE.

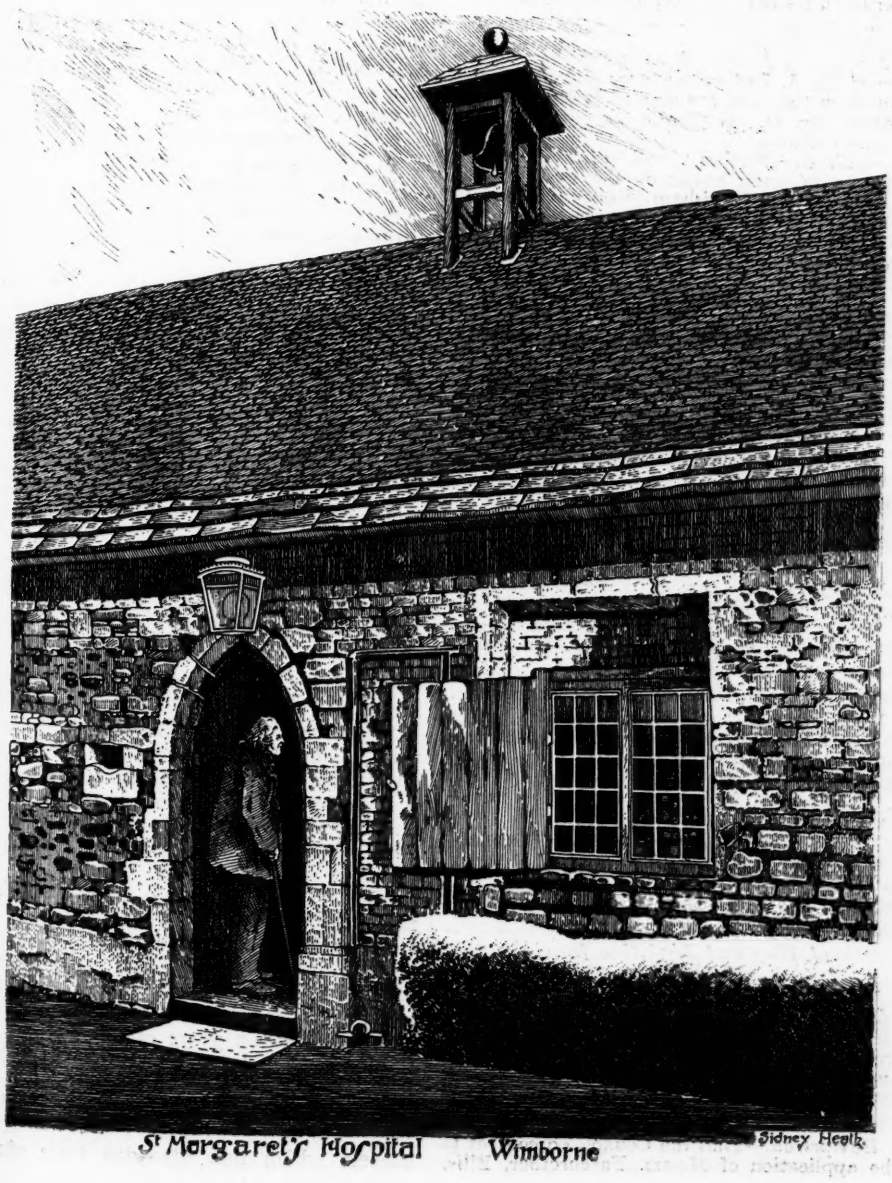
LIKE so many of our really old charitable institutions, St. Margaret's Hospital, situated a quarter of a mile to the north-west of Wimborne, appears to have been founded originally for lepers. Tradition gives John of Gaunt, son of Edward III., as the founder, but what slight documentary evidence exists seems to indicate an early XIIIth century institution. The foundation was not one of the well-endowed, and it appears to have been largely, if not altogether, maintained by the gifts of the charitable, who, in return, were granted various indulgences, as is set forth in a deed dated XVI. Henry VIII., wherein we learn that

"Pope Innocent IV., in the year 1245, by an indulgans or bulle did assoyl them of all syns forgotten, and offences done against fader and moder, and all swerynges neglygently made. This indulgans, granted of Petyr and Powle, and of the said pope, was to hold good for 51 yeres and 260 days, provided they repeated a certain specified number of Paternosters and Ave Marias daily."

The chapel joins one of the tenements of the almsmen, and here comes one of the Minster clergy every Thursday afternoon to conduct service. The interior has been refitted in recent years, but the windows, walls, etc., remain in their original state. There are three doors in the north wall, the doorways of which are chamfered and have pointed heads. The east window has a semicircular head, plain wooden tracery dividing it into two lancets with an opening above them. On the south side some pointed doorways and a lancet window help to determine, together with the deed already quoted, the XIIIth century origin of the building. Some traces of frescoes, both geometrical patterns and figures, remain on the inside walls. The roof is an open one of timber, with the beams running across at the level of the wall plates. To the left of the doorway selected for illustration will be seen a very good outside holy-water stoup, the surface of the stone having been worn into a deep hollow by contact with generations of hands. This stoup is quite perfect, a very rare thing with exterior stoups, while its lefthanded position is rarer still, that is assuming that it is now in its original position, as is highly probable, for had the wall been rebuilt since the Reformation the stoup would have been destroyed. The only other outside stoup in Dorset with which the present writer is acquainted is an equally good example in the wall of the side porch of Broadmayne Church, near Dorchester.

The tenements attached to this little hospital are nine in number—three occupied by married couples, three by men, and three by women. The walls of these dwellings are at present a mixture of stone, rubble, and modern brick. The old stone mullions have been pulled out for the insertion of more modern windows, but portions of the old framings remain, as do a few wooden door frames embedded in the walls, and one or two courses of the enormous slabs of stone that originally covered the roof.

SIDNEY HEATH.



THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir R. Melvill Beachcroft, Chairman, presiding.

Roller Skating Palace and Club, Maida Vale.—It was agreed to grant a certificate with regard to the Roller Skating Palace and Club, Delaware-road, Maida Vale, on being satisfied that the premises have been completed in accordance with the two drawings, submitted by Messrs. Gregg & Detmar.

Remuneration of Quantity Surveyors.—The following recommendations were agreed to:—

That Messrs. Northcroft, Neighbour, & Nicholson, quantity surveyors, be allowed 2 per cent. on 2,000*l.* of the amount of the contractors' estimate, 2,140*l.*, for "works to existing buildings" as detailed in the bills of quantities for the enlargement of Amberley-road school (Paddington, N.).

That Messrs. Young & Brown, quantity surveyors, be allowed 2½ per cent. (i.) on 1,000*l.* of the amount of the contractors' estimate, 1,114*l.*, for "tar-pavement, latrines, and drainage," and on 279*l.*, (ii.) the estimate for "exterior painting and repairs" as detailed in the bills of quantities for the structural improvement of the Marner-street school (Bow and Bromley).

Kensington Improvement.—The Improvements Committee recommended that application be made to Parliament in the session of 1910 for authority to widen Church-street, Kensington, to the south of Clarence-mews; and that provision be made in the Bill to require the Kensington Royal Borough Council to contribute one-half, not exceeding 25,000*l.*, of the cost.

Epileptic Colony: New Villas, etc.—The Asylums Committee recommended that, subject to the approval of the necessary plans by the Home Secretary, the estimate of expenditure on capital account of 13,304*l.*, submitted by the Finance Committee in respect of the erection and equipment at the epileptic colony of two additional villas (one for fifty male and the other for thirty-eight female patients), and a general bathroom, and of extending the accommodation for staff in the administration block, and equipping the additional accommodation thus provided, be approved.

Ground Plan of London.—It was reported that up to September 30, 1909, the ownerships of 113 square miles, 338 acres of the administrative county of London had been dealt with, and the boundaries of 33,009 estates (each estate representing one owner) had been defined on the ownership section of the ground plan of London.

Re-erection of Crosby Hall.—The Improvements Committee reported as follows:—

"Drawings have been received showing the proposed re-erection by the University and City Association of London, Ltd., of Crosby Hall, on part of lots 1 to 4, Cheyne-walk, which are surplus lands from the Battersea Bridge improvement, and on adjoining land. It is intended to use all those portions of old Crosby Hall which have been preserved. These consist of (i.) a moulded and panelled ceiling,

(ii.) mullions, jambs, and tracery of windows, and (iii.) an oriel window and vaulted roof. A new roof will be constructed to support the old timbers, ceiling, and roof covering. We think that, subject to compliance with the London Building Acts, etc., and to certain general conditions, the drawings may be approved. We have informed the Local Government, Records, and Museums Committee of the facts.

The Committee recommended accordingly.

Apprenticeship.—The Education Committee recommended:—

(*a*) That, in the opinion of the Council, if new duties connected with the apprenticing of boys and girls are entrusted to local education authorities, corresponding grants should be made; that, inasmuch as industrial training is a national and not a local question, technical institutions and technical scholarships should be supported to a much larger extent than at present out of funds provided by the national exchequer, and that the Board of Education be so informed.

(*b*) That a copy of the foregoing report be forwarded to the Board of Education, the Board of Trade, and the Local Government Board.

(*c*) That the foregoing report on the apprenticeship question, submitted by the Education Committee on November 9, 1909, be placed on sale.

Mr. Cyril Jackson moved the adoption of the report, and the Hon. W. Peel moved as an amendment:—"That, while not expressing an opinion upon the suggestions contained in the report, the Council considers that if new duties connected with the apprenticing of boys and girls are entrusted to local education authorities, corresponding grants should be made; that, inasmuch as industrial training is a national and not a local question, technical institutions and technical scholarships should be supported to a much larger extent than at present out of funds provided by the national exchequer, and that the Education Committee be instructed to consider whether it should confer with the Board of Trade with reference to the establishment of employment agencies for children leaving school in conjunction with the new labour exchanges of that body."

Mr. Cyril Cobb seconded the amendment.

Mr. F. L. Dove said that while it was true that elementary education had gone beyond the "Three R's," it had also largely neglected them, with the result that thousands of children were being turned out on the world every year without even an elementary education. He was afraid that not much was to be hoped from trade schools. The age when boys wanted their preliminary training was not fourteen or fifteen, but eleven or twelve. He should like to see the report go back, and an effort made to get in touch with the employers' associations and such interested bodies. All the Committee had done in that respect was to go to the polytechnics, which were not much good; but if the Council got in touch with the men concerned, a scheme might be evolved which would be of advantage.

Mr. Cooper said he believed the Government ought to make grants in order that workmen might keep their sons longer at schools learning their trade instead of going out into the world at the earliest age to earn their living. While the training of the children was most desirable, still one must not look to that alone for the abolition of unemployment, as many skilled workers were unable to find work. Owing to existing economic conditions the parents were only too glad that a boy should go to work as early as possible, in order that there might be an addition to the family purse and added comforts in the home. He was convinced that the real reason why the apprenticeship system was breaking down was that all trades were becoming so much more specialised than they were a few years ago.

The amendment was adopted as the substantive motion. Consequently, after further debate, the Council rejected the recommendation "B," and in place of "C" a resolution was adopted to the effect that the Education Committee should be instructed to prepare for publication a report, together with any reports on the subject by the Finance Committee, it being made clear that the Council had not expresed any opinion on the details.

Withdrawn Tenders.—Mr. Johnson inquired the number of tenders which had been withdrawn since "the protection of the Works Department had been removed."

Mr. Greenwood said fifty-four had been withdrawn, as follows:—Thirty-eight for education work, eight for highways, four for housing, one for improvements, and three for main drainage.

The Preference Clause.—Mr. Johnson questioned the accuracy of a statement that the Education Committee, in the contract for the new school at Haverstock-hill, had insisted upon a clause for the preference of employment being given to London men.

Mr. Cyril Jackson replied that the statement was not then quite correct, but that since then the contractors had agreed to give preference to London unskilled and casual workmen.

Handicraft Centres.—A report of the Education Committee proposed that ten new handicraft centres should be built every year, the average cost of a centre being 650*l.*, exclusive of the cost of site.

The recommendation was agreed to, an amendment in favour of twenty centres a year being rejected.

It was mentioned that it will take twenty-six years, at the rate of progress of ten per year, to complete the accommodation necessary.

Having transacted other business the Council adjourned.

APPLICATIONS UNDER THE LONDON BUILDING ACTS, 1894 to 1909.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Acts, 1894 to 1909. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Bermondsey.—That the application of Messrs. G. Elkington & Son for an extension of the periods within which the erection of buildings on the site of Nos. 117, 118, 119, 120, 121, 122, 123, and 123A, Grange-road, Bermondsey, was required to be commenced and completed, be granted.—Consent.

Brixton.—Additions at the Stockwell Brewery to abut upon the north-western side of Stockwell Green, Brixton (Mr. W. E. Davies for Messrs. C. Hammerton & Co., Ltd.).—Consent.

Brixton.—One-story shops in front of Nos. 414 and 416, Coldharbour-lane, Brixton (Messrs. Style & Winch).—Consent.

Clapham.—A one-story building at the rear of No. 73, Lavender-hill, Clapham, to abut upon the western side of Rush Hill-road (Mr. A. R. Westworth for Mr. J. Soper).—Refused.

Hackney, Central.—A shop front at No. 149, Lower Clapton-road, Hackney (Mr. G. Stapley for Messrs. Barrett & Power).—Consent.

Hackney, Central.—A wood and glass roof over the sunk area in front of No. 26, Church-road, Dalston (Mr. F. Garick for Mr. F. Hilling).—Consent.

Kensington, North.—A one-story shop at the rear of No. 1, Ladbroke-grove, Kensington, to abut upon the northern side of Holland Park-avenue (Mr. G. W. Clarke for Mr. H. Ashcroft).—Refused.

Lewisham.—Porches and wooden bay windows to seven houses on the western side of Fermor-road, Lewisham (Messrs. Norfolk & Prior for Mr. C. Walker).—Consent.

Lewisham.—A vicarage and parish hall on the western side of Clarendon-road, Lewisham (Messrs. Greenaway & Newberry for the Rev. J. C. Morris).—Consent.

Lewisham.—A house on the northern side of Micheldever-road, Lewisham, to abut upon the western side of Wantage-road (Mr. G. A. Lansdown for Messrs. W. J. Scudamore & Sons).—Consent.

Strand.—The retention of a projecting sign at No. 195, Wardour-street, Oxford-street, Strand (Messrs. N. Burt & Co., Ltd.).—Consent.

Wandsworth.—A building on the eastern side of Ramsden-road, Wandsworth (Mr. J. H. Tuppen).—Consent.

Lines of Frontage and Construction.

Battersea.—Retention of a wood and iron shed at the flank of No. 70, Rosenau-road, Battersea, abutting upon the southern side of Ethelburga-street (Messrs. J. A. J. Woodward & Sons for Mr. J. Booth).—Refused.

Line of Frontage, Projection, and Construction.

Rotherhithe.—The erection over the public way of Shad Thames, Rotherhithe, of a steel tube grain conveyor between two parts of the premises known as Cole's Upper Wharf (Mr. J. M. Kennard for Messrs. A. & P. Keen).—Consent.

Width of Way, Frontage, and Construction.

Marylebone, East.—An iron and glass shelter on the southern side of Castle-street East, St. Marylebone, at the premises of Messrs. Waring & Gillow, Ltd. (Mr. R. F. Atkinson).—Refused.

Width of Way and Deviation from Certified Plans.

Whitechapel.—Deviations from the plans approved for the re-erection of a building known as the "Alma" Brewery, on the western side of Spelman-street, Whitechapel, and the northern side of Booth-street (Mr. W. Stewart).—Consent.

Formation of Street.

Hampstead.—That the Council do consent to the application of Messrs. Farebrother, Ellis, & Co., for permission to define the roadway of a new street for carriage traffic leading from Redington-road to West Heath-road, Hampstead, by twelve concrete posts.—Consent.

Space at Rear and Alteration of Buildings.

St. George, Hanover-square.—An iron and glass winter garden over the space at the rear of No. 32, Grosvenor-square, St. George, Hanover-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Alteration of Building.

Kensington, South.—The covering in of the open yard at the rear of No. 2, Cromwell-place, Kensington (Mr. W. C. Poole for Col. C. Mathew Dinaldson).—Consent.

Uniting of Buildings.

City of London.—The uniting of Nos. 9 and 10, Fell-street, City, by an opening at the second floor level (Mr. W. O'Neill).—Consent.

Cubical Extent.

Clapham.—The erection at the premises of Ross, Ltd, North-side, Clapham Common, of a division to exceed in extent 250,000 cubic ft., and to be used only for the purposes of the manufacture of scientific instruments (Messrs. Searle & Searle for Ross, Ltd.).—Consent.

Marylebone, West.—A further deviation from the plans approved in respect of the erection upon a site abutting upon Oxford-street, Duke-street, and Somerset-street, St. Marylebone, of a building with divisions to exceed in extent 250,000 cubic ft., so far as relates to the erection of a fire-resisting glazed screen (Mr. R. F. Atkinson).—Consent.

THE INSTITUTE OF SANITARY ENGINEERS:

ANNUAL DINNER.

THE annual dinner of the Institute of Sanitary Engineers was held on the 17th inst. at the Holborn Restaurant, W.C., Mr. W. H. Prescott, A.M.Inst.C.E., President, in the chair. There were also present:—Sir Ernest Clarke, M.A., his Honour Judge Rentoul, K.C., Professor W. R. Smith, M.D., D.L., Professor E. G. Coker, M.A., D.Sc., Professor Henry Adams, Messrs. Hamar Greenwood, M.P., Llewelyn Williams, M.P., Alderman Sir D. Burnett, D.L., H. T. Wakelam, W. J. Dibdin, F.I.C., A. Fidler, E. T. Hall, J. A. Howard, Baldwin Latham, T. W. Aldwinckle, H. D. Searles-Wood, E. J. Silcock, Dr. A. Wynter Blyth, A. S. E. Ackermann, S.Sc., E. White Wallis, A. J. Martin, H. M. Hodgson, C. McArthur Butler, G. W. Chilvers, G. Trotman, E. R. Palmer, J. Lawrance, N. W. Hoskins, Hon. Secretary, and others, including several ladies.

The loyal toasts having been honoured,

Sir Ernest Clarke, M.A., proposed the toast of "The Houses of Parliament." He said the time had come when the relationship between the two Houses and the work they had to do would have to be seriously considered. The work of the Empire could not be done in that abominable air which prevailed at Westminster, and the trivial matters often considered could well be done by lesser bodies. It was a pity that we could not do something to approach the great problems of the Empire; and when matters settled down it was hoped that the public health affairs of the country would have attention if we were to retain our physical welfare.

Mr. Hamar Greenwood, M.P., and Mr. Llewelyn Williams, M.P., both responded.

Professor Henry Adams, Past-President then proposed the toast of "Kindred Institutions." He said it had been suggested that when the Institution of Civil Engineers had its new premises they should take under their wing the various kindred institutions which existed.

Mr. H. T. Wakelam, President-elect, responded.

Professor W. R. Smith, M.D., D.L., also replied, and said that not one of the institutions referred to could claim any great antiquity, the oldest of them being only about eighty-one years of age. But when they came to realise the amount of work which had been done by all these public health associations and societies during that time they were struck with the magnitude of the success which had attended their efforts.

During that period great attention had been paid to the causation and prevention of disease with marked success. The expectation of life was very much greater, and the whole conditions of the people had been raised and improved. It was gratifying to know that one of the youngest of the societies referred to, the Institute of Sanitary Engineers, had shown that they were desirous of working with the greatest harmony with all other associations.

Alderman Sir D. Burnett, D.L., then proposed the toast of "The Institute of Sanitary Engineers," coupled with the name of the President. He referred to the excellent work done and being done by the Institute and its President, and expressed the belief that there was a great work before the Institute.

The President, in response, said he was glad to be able to announce that the work of the Institute continued to make progress in every department, thanks to their energetic and able Hon. Secretary, Mr. Hoskins, assisted by a progressive and competent Council. The membership in particular had shown a more than usually satisfactory increase during the past year, and now it was nearly 700, with further indications of steady growth. The Institute was never in a better position, both financially and numerically, and they had reached this position from the smallest beginnings. The present position of the Institute proved the necessity for it. They were living in an age of specialists, and although they recognised that the Institution of Civil Engineers was the parent institution, still it was deemed desirable, having regard to the special character of the sanitary engineer's work, to have an Institute of their own. The many and varied societies had done no harm to the parent institution; on the contrary they had it on the authority of the President of the Institution of Civil Engineers that their work in the main had been productive of much good. He (the speaker) claimed that the work of the sanitary engineer had resulted in a great improvement in the health of the nation. As sanitary engineers they were responsible for the sanitation and healthful surroundings of municipalities, and they kept before them the ideal of a municipality in which every citizen who observed the ordinary laws of health would have an equal chance with others of living the whole days of his life. The work of the sanitary engineer had made great progress, but much had yet to be done. Still, they had vastly better conditions than they had in the past, sanitary measures were much better understood, and they were not now familiar with those high death-rates of which one heard so much in days gone by.

Mr. W. J. Dibdin, F.I.C., F.C.S., then proposed the toast of "The Visitors." In the course of his remarks he said that they had heard about the oldest engineering institution that evening, but there was an institution much older than eighty-one years, *i.e.*, the microbe—rightly understood, the greatest friend of man on earth. Mr. Dibdin referred to the help of Mr. Llewelyn Williams, M.P., in getting "Ltd." eliminated from the title of the Institute. With the toast he coupled the name of his Honour Judge Rentoul, K.C., LL.D., who responded.

The concluding toast was "The Ladies," proposed by Mr. A. J. Martin and acknowledged by Mr. H. M. Hodgson.

PROPOSED SUBWAYS, LONDON.—Statutory notices are given of applications which will be made to Parliament in the ensuing session by the Baker-street and Waterloo Railway Company for the construction of a subway at Oxford-circus, between Great Castle-street, on the north side of Oxford-street, and their station at the corner of Argyll-street, with a reconstruction and improvement of the station; and by the London County Council for subways at the lower end of Northumberland-avenue, with communications between the two sides of Victoria-embankment and the eastern platform of Charing Cross Railway-station.

Legal Column.

WORKMEN'S COMPENSATION: WHAT IS A WORKMAN?

THE decision of the Court of Appeal in the case of Walker *v.* The Crystal Palace Football Club, Ltd., is one of considerable importance, since it raises for the first time since the Workmen's Compensation Act, 1906, came into force the question whether the term "workman," is to be interpreted in its ordinary sense, as it would commonly be understood, or whether under the defining section of the Act it is to be given a wider meaning. The applicant in this case was a professional football player, and he had entered into an agreement with the respondents, which was to be in force for a year, to play for the club in all matches when required by the club, not to engage in certain other businesses or sports, to observe all the training and other regulations of the club, and to be subservient to the captain when playing, and his salary was to be 3*l.* 10s. a week. He met with an injury whilst playing in a match and claimed compensation, and the Court held that he was a "workman" within the meaning of the Act. This decision raises a most important question as illustrating the very wide scope of the present Act.

Under the Act of 1897 "workman," though defined in very wide terms, had this important limitation, that it only embraced persons engaged in any employment to which that Act applied, and the employments were specified. That definition ran:—"'Workman' includes every person who is engaged in an employment to which this Act applies, whether by way of manual labour or otherwise, and whether his agreement is one of service or apprenticeship or otherwise, or is expressed or implied, is oral or in writing." Even under that Act the majority of the Court of Appeal in Bagnall *v.* Levenstein (December, 1906) held that a skilled expert engaged under an agreement somewhat similar in terms to the above, in dye and chemical works, and whose duties involved some manual labour, was not a workman.

The terms of the new Act are wider; it extends to "any employment," and "workman" is defined to mean "any person who has entered into or works under a contract of service or apprenticeship with an employer, whether by way of manual labour, clerical work, or otherwise, and whether the contract is expressed or implied, is oral or in writing." Then there are the exceptions. It does not include a person employed otherwise than by manual labour whose remuneration exceeds 250*l.* a year, or a person casually employed otherwise than for the purposes of the employer's trade or business, or a member of a police force, an outworker, or a member of the employer's family dwelling in his house. In the case under consideration the man was not receiving more than 250*l.* a year, therefore the question as to manual labour did not directly arise, although the Master of the Rolls expressed the opinion that playing football was being employed by way of manual labour! The question really amounts to this: Is everyone who serves under a contract of service in any capacity whatever to be deemed a "workman" under the Act and entitled to compensation, and are employers to insure on this basis? In Simpson *v.* Ebbw Vale Steel, Iron, and Coal Company (the *Builder*, February 18, 1905), Lord Collins, then the Master of the Rolls, drew attention to the title of the Act of 1897: "An Act to amend the law with respect to compensation to workmen," which, he said, had some bearing on the question, and he laid it down that the Act must be construed reasonably, and that its main purpose was apparent on the face of it, as, although the definition makes it possible to apply it to a person not engaged in manual labour, still that person must be a workman. Lord Justice Mathew also said that from the title of the Act and all the way through it was apparent that the intention of the Act was the protection of "workmen," using that term in its ordinary and popular sense. The title to the Act of 1906 is the same as that of the Act of 1897, then under discussion, and a decision of the House of Lords as how the definition is reasonably to be interpreted will be awaited with interest. Certainty is of importance, and some limitation must be imparted into the definition, having regard to the subject matter of the legislation in which the definition occurs. Legislation, for example, dealing with building structures, would not be extended to ships merely because the definition given in an Act of "building structures" was capable of being read so as to include such structures as vessels.

POWERS OF MUNICIPAL CORPORATIONS.

A small point interesting to Municipal Corporations has been decided in the case, Mayor, etc., of Scarborough *v.* Cooper. The Corporation desired to dispose of a portion of the ancient corporation land in consideration of the grant of a perpetual yearly rent-charge. The agreement was dated May 11, 1909, but the purchasers declined to complete on the ground that the Corporation could only dispose of the land in fee simple in consideration of lump-sum payments, and the Corporation brought this action for specific performance. The matter is governed by the Municipal Corporations Act, 1882, sect. 108 of which restrains, with certain exceptions, the corporations from leasing their land without the consent of the Treasury—now, under sect. 72 of the Local Government Act, 1888, the Local Government Board, unless authorised by Act of Parliament. Sect. 109, however, gives them powers, with the consent of the Local Government Board, to dispose of any corporate land either by way of absolute sale or by way of exchange, mortgage, lease, or otherwise, and in this case the consent had been obtained. The Court decided in favour of the Corporation, and the case seems absolutely clear, but the doubt seems to have arisen by considering the powers of local authorities under sect. 175 of the Public Health Act, 1875, but that section, as the Court pointed out, is totally different and only contemplates a sale or exchange.

ACQUISITION OF PROPERTY FOR STREET WIDENING.

A curious point seems to have arisen in the case of Wild *v.* Woolwich Borough Council in connexion with the Act 57, Geo. iii., c. xxix, known as Michael Angelo Taylor's Act, which gives powers to local authorities to acquire property for widening streets. The plaintiffs in the action were trustees of certain house property which was subject to certain leases. The defendant Council had in the first instance approached them to sell so much of the property as was required for the street-widening operation, but as they were trustees without power of sale the defendants resorted to the Act and gave notice to treat for the acquisition of the property. The plaintiffs objected to the notice on the ground that it would be improper for them to comply with it, as it would leave a strip of land on their hands which would be useless; they also raised the point that they were only reversioners subject to leases of some duration, and they threatened to take proceedings to restrain the defendants from acting upon the notice. The matter then remained in abeyance, but about ten months later the defendants served a fresh notice to acquire the entire property the subject of the first notice. This the plaintiffs objected to on the ground that it included property wholly unnecessary for the street-widening scheme, and they threatened proceedings. The defendants therefore withdrew the notice, and the Court below and the Court of Appeal have held that it was open for them to do so after

repudiation of the notice by the plaintiffs. The plaintiffs could not accept part and repudiate part, they must accept or repudiate the notice as a whole; and it was held that they had repudiated both notices. As to the right to acquire portions of a property under the above Act, see the cases referred to in our Notes, the *Builder*, August 19, 1902; January 6, 1906; and July 17, 1906.

Building Estates and Restrictive Conditions: Land Transfer Acts.

An interesting point to builders was raised last week in the Chancery Division in the case of Willé *v.* St. John and others. Fourteen acres, forming part of the Du Cane Estate, were conveyed by trustees to one of the defendants, the deed containing amongst others a condition that no building should be erected on the lands so conveyed other than private dwelling houses. This defendant shortly afterwards caused himself to be registered as the owner of the land, but no entry was made as to the restrictive conditions. Some two years later this defendant sold the plaintiff a plot, the conveyance binding the plaintiff to observe the conditions contained in the original conveyance of the 14 acres to this defendant, and also others imposed by this defendant, and on the same date this defendant registered under sect. 84 of the Land Transfer Act, 1875, as amended by the schedule to the Land Transfer Act, 1897, the restrictive conditions contained in the original conveyance to him. About a week later the plaintiffs' plot was registered. About two years later this defendant conveyed another plot to some of the other defendants, the conveyance being expressed to be subject to the conditions of the original conveyance to him, but he agreed that as far as he was concerned he should raise no objection to the erection of a church. These defendants erected a church and priest's house, and the plaintiff brought this action against all the defendants and sought a mandatory injunction for the removal of these buildings. To succeed in this claim it would be necessary for the plaintiff to show that there was a general building scheme affecting the whole of the land. In Elliston *v.* Reacher the principles governing such schemes so as to create rights between the several purchasers were considered, and they are set out in the *Builder*, September 12, 1908. Shortly summarised they are (1) both plaintiff and defendant must derive title under a common vendor; (2) previous to selling the vendor must have laid out the estate, or a defined portion thereof, including the land acquired by the plaintiff and defendant, for sale in lots subject to restrictions intended to be imposed on all the lots and which, though varying in details, are intended to be consistent and consistent only with some general scheme of development; (3) these restrictions must be intended by the common vendor to be for the benefit of all the lots intended to be sold whether or not they are intended to be for the benefit of other land retained by him; (4) both plaintiff and defendant, or their predecessors in title, must have purchased from the common vendor on this undetstanding. Applying these principles to the facts of the present case it will be seen that there was no building scheme and that the conditions sought to be enforced were not imposed by a common vendor, but by the previous vendors, the trustees of the Du Cane estate. The defendant who had sold to the plaintiff had formulated no scheme, nor had he imposed any consistent restrictions on his purchasers. The new point to be decided, however, was whether the registration made any difference. Sect. 84 of the Land Transfer Act, 1875, provides for the registration of conditions as annexed to the land, and "the first proprietor and every transferee and every other person deriving title from him shall be deemed to be affected with notice of such conditions." The Court held that registration did not suffice to annex conditions to the land so as to be enforceable by an owner of part of the land against an owner of another part, the section assumed that they had been annexed by some legal method; it gave notice to every subsequent transferee of the conditions imposed under the original conveyance, but in no way affected the legal position created by those conditions, and the action therefore failed.

Gas Companies and Tramway Companies.

The case which arose out of an arbitration between the Bristol Gas Company and the Bristol Tramway Company (noted the *Builder*, July 24) has now been considered in the Court of Appeal. It involved a construction of sect. 32 of the Tramways Act, 1870, which regulates the rights of local authorities or companies to break up roads along which tramways are laid for the purpose of repairing, altering, or removing some portion of their fixed plant. The claim was made by the Gas Company in respect of additional expense incurred by the company by reason of the existence of the tramway in (1) laying down a new service-pipe and connecting the same with a main laid down before the construction of the tramway; (2) repairing, altering, etc., a service-pipe connected with a main laid before the tramway, the service-pipe itself having been laid since the tramway was constructed; (3) repairing, etc., a service-pipe or main laid before the tramway was constructed.

The Court of Appeal affirmed the decision of the Court below, which, in its turn, had affirmed the findings of the Referee appointed to arbitrate under sect. 33 of the Act. The result as regards the above heads of claim was that the expenses of laying down new service-pipes was disallowed, but not those of connecting them with the existing main. The Court below had some doubt on this latter point, but the Court of Appeal held the connexion to be an alteration of the main. Expenses of altering, etc., service-pipes laid since the tramway, were disallowed, but not those incurred in connexion with service-pipes laid before the tramway.

One other point remains to be noticed. It was contended that the work for which the extra expenses could be recovered, under sub-sect. 5 of sect. 32 of the Tramway Act, must be work "whereby the traffic on the tramway will be interrupted" as prescribed by sub-sect. 2. This view had not been accepted in the Court below or before the Referee, but the Court of Appeal placed that interpretation on the section. It made no difference to the judgment because it had been found that as a fact there had been interruption of the traffic, such interruption being that for one day the traffic was worked on a single line, and that at various times the cars had had to be slowed down or stopped to enable the workmen to leave the trenches.

Valuation of Property for Different Purposes.

Judgment has now been given in the case to which we referred in our issue for October 23. Surveyors received instructions to value certain warehouse property as between a willing vendor and a willing buyer for a fee of ten guineas. They valued the property at 2,000*l.*, but, subsequently finding that the valuation had been made to enable the defendants, who had instructed them, to raise 1,250*l.*, by mortgage on the premises, they communicated with the solicitors of the proposed mortgagees to the effect that they did not consider the property suitable as security. The surveyors sued the defendants for their fees, as they explained, as a matter of principle, and the defendants defended the action on the ground that the plaintiffs had stultified the object for which their report was required. The judge of the City of London Court referred the matter to the President of the Surveyors' Institution, who reported that the plaintiffs were entitled to recover, and judgment was accordingly returned for the plaintiffs. Such were the facts as reported in the *Times*, but the grounds upon which the President of the Surveyors' Institution based his report were not published. In the interest of all parties it would seem desirable that where a report is stated to be required for a specific object it should not be used for one quite different, and it is obvious that an open valuation obtained as such would vary from that made as between a willing buyer and a willing seller, and that when the valuation is made for the purposes of mortgage entirely different considerations arise. The advisers of any party are entitled to be treated with openness and candour.

Workmen's Compensation: Operations on Workmen.

The position under the Workmen's Compensation Act of employers and workmen where the question arose as to whether or no incapacity could be cured were the workman to submit to an operation for a long time remained in uncertainty, but four recent decisions have now made the matter tolerably clear. The first of these cases was Warncken *v.* Richard Moreland & Sons, Ltd., which we noted in our issue of December 12 last, in which the Court of Appeal laid it down to be a question of fact whether the incapacity was due to the accident or to the workman's unreasonable refusal to submit to an operation. Next came the case, Shirt *v.* Calico Printers' Association, Ltd. (the *Builder*, April 17), in which the Court of Appeal held that if a workman does so reasonably submit himself to an operation and death ensues under the operation his dependants are not debarred from claiming compensation as resulting from the accident. Then came the case of Tutton *v.* Owners of the Steamship *Majestic* (the *Builder*, April 17), in which the Court of Appeal had to consider what was reasonable conduct, and they then laid it down that the question the arbitrator had to consider was not the balance of medical testimony as to whether the operation might reasonably be performed, but the reasonability of the patient. In that case the man was suffering from Bright's disease, and his own doctor, and also an anæsthetist, had advised him not to undergo the operation, and the Court held that he was reasonably entitled to follow that advice. In that case there was no allegation either that the doctor was incompetent or that the man was malingering, and, as a matter of fact, the other doctors who advised an operation were not in such a good position to judge of the danger, as they had no special acquaintance with the man's idiosyncrasy and previous history. The latest case on this subject is Marshall *v.* Orient Steam Navigation Company, Ltd., decided by the Court of Appeal last week. A man had suffered a burn on his right hand, some septic matter formed in one of the fingers, the ship's doctor suggested an operation which, in his opinion, could have saved the finger, but the man refused to undergo it, and in the end the man's finger had to be amputated in hospital. The County Court judge found that the man's refusal was unreasonable, and thus far the case would seem to fall under the principles laid down in the cases cited above; but here another element was introduced, as another doctor gave evidence that the finger was so implicated that the operation could not have saved it. In this direct contradiction in the medical evidence the judge felt himself placed in a difficulty, but he awarded the man compensation on the ground that the employers had not been able to prove that the incapacity was not the direct result of the accident, and the Court of Appeal affirmed his decision. The law is now therefore clear. Two things have to be proved to the satisfaction of the Court. (1) Did the workman take reasonable steps to cure his incapacity; was his refusal to submit to an operation reasonable? (2) Is the incapacity due to his unreasonable conduct? The burden of proving these two

points is laid upon the employer, because when once the workman has proved that he has suffered personal injury by accident arising out of and in the course of his employment it is then for the employer to prove that the chain of causation was broken, and that the incapacity is due to some other cause than the accident. It is the same principle as is applied where the employer sets up the defence of serious and wilful misconduct.

Competition News.

GLAZED BRICKWORK DESIGNS.

A Committee of Glazed Brick Manufacturers are inviting designs for works to be executed in glazed brickwork, and also essays as to the advantages to be derived from the use of this material. Prizes of 100 guineas, 50 guineas, and 25 guineas are offered, and further particulars will be found in our advertisement columns, page iv.

TECHNICAL SCHOOL, KENDAL.

The competitive plans for this building have been on view at the Town Hall, and the General Purposes Committee of the Council have awarded the premiums as follows:—(1) Mr. W. L. Dolman, Windermere; (2) Mr. Malcolm G. Shaw, Kendal; (3) Mr. Stephen Shaw, Kendal.

BOOKS RECEIVED.

THE SCULPTURES OF CHARTRES CATHEDRAL. Text in English and French. By Margaret and Ernest Marriage. Pp. 270. (Cambridge University Press. 12s.)

THE ELEMENTS OF REINFORCED CONCRETE BUILDING. By G. A. T. Middleton, A.R.I.B.A. Pp. 111. (Francis Griffiths. 4s.)

NATURE AND ORNAMENT. Part II. Ornament the finished product of design. By Lewis F. Day. Pp. 274. (B. T. Batsford. 1909. 7s. 6d.)

Correspondence.

MR. NORMAN SHAW'S SOIL-PIPE SYSTEM.

SIR,—Will Mr. Norman Shaw tell us how he manages to get over the sanitary authorities' by-laws, which generally demand that there shall be a trap immediately under the water-closet basin, and there shall not be one at the foot of the soil-pipe, where he puts it; also that soil-pipes shall be at least 4 in. diameter?

What is more important—how is it possible to prevent soil from remaining in the trap at the foot of the soil-pipe (as I have known it to do), there setting up a most foul stink just under the windows of ground floor rooms?

I daresay it is a queston of method of connecting, or, rather, discharging, the soil-pipe over the trap in some exact and careful way. I presume that there is no grating on the gully, or that if there is the soil-pipe discharges under it.

Another point not clear is what Mr. Shaw means by "no disconnecting tank."

W. B. HOPKINS.

Berkhamsted.

THE DISCONNECTING TRAP.

SIR,—The disconnecting trap cannot be claimed as an invention by any person. It is a product of evolution.

I first knew it as an ordinary siphon (dipped pipe) with a 2-in. water seal, and it was placed within a few feet of the sewer (buried like a coffin), and was a source of income to the jobbing builder to bring his rods to clear it, or to dig up the garden or road to get at it, and was gradually moved nearer the building, and improved by adding a cleaning hole on top.

Roger Field's letters to the *Times*, 1874-5, called attention to the then existing unsatisfactory state of the connexion between the internal and external drainage of houses, and from that time till now there has been continuous improvement, but no invention.

It is refreshing to hear that Mr. Norman Shaw's system, which met with such ridicule thirty years since, is practically efficient, as theoretically it is opposed to all sanitary experience.

ROBERT PHILLIPS.

BUILDERS TAKING OUT THEIR OWN QUANTITIES.

SIR,—In your editorial columns of November 13 issue you discuss the above matter, but, with due respect, I regret, hardly, in my view, do it justice. For instance, you argue that when builders compete for the erection of a building that it is not good for "architecture" and tends to a "skimpiness" of construction. Surely this has nothing to do with "competition"? The client and the architect settle this between them; the former requires certain accommodation and has only a certain sum to spend, therefore the architect cannot indulge (as you mention) in the luxuries of the XVIIth or XVIIIth century, so "cuts his coat according to his cloth."

The client cannot understand that the 1½ per cent. for the surveyor is at all necessary, when the architect can send to the competing contractors sets of the drawings and copies of the specification (for which, of course, the architect charges), and you express your astonishment if the builder does not add his charges for taking out the quantities himself; and, again, when the builder calculates the cost of the building himself there is no properly-priced schedule for the variations to be adjusted on at the completion of the work. I ask where the hypothetic saving to the client comes in when the work is done in this slap-dash style?

It seems a hard saying, but the probable explanation is that the architect imagines that he may probably get a lower tender from a builder who wants the job badly than he otherwise would do if the builder had a proper set of quantities from a surveyor, who, if respectable, looks impartially after the builder's interests as well as those of the client.

A SURVEYOR.

*** Our correspondent hardly understands our argument, and we did not "express astonishment" at all; we merely said that if a builder took out the quantities himself it was to be presumed that he added something to his estimate to cover that. But see our further Note on the subject, page 575 (written before we received the above letter).—ED.

THE AREAMETER.

AS A simple and inexpensive form of the planimeter, the instrument placed upon the market by Mr. A. E. Mallandain is of interest to architects and surveyors. The areameter is supplied in sets of two celluloid or zinc curves shaped so that a figure bounded by curved lines, or having a straight line as one boundary, can be divided into constant and equal areas. The smaller curve gives areas of ½ sq. in., and the larger one areas of 1 sq. in., the former insuring greater accuracy, and being recommended for measurements within its radius. Two methods of using the areameter are illustrated by Figs. 1 and 2. Referring to Fig. 1, the procedure is as follows:—Place a pin to serve as an axis at the centre of the plot, apply either of the curves with the notch against the pin, prick two points on the boundary of the plot one at each side of the curve, rotate the curve about the pin so that the edge previously at the first pricked point comes over the second pricked point, prick off a third point at the outside edge of the curve, and repeat the same process until the curve has been rotated through a complete circle. It will then be found that the boundary of the plot has been divided so that lines drawn from the points to the centre would divide the plot into triangles of equal area, or all of equal area except the last triangle of the series. The width of any such smaller triangle can be expressed as a decimal fraction of the width of the triangles on either side of it, as will be explained later.

No lines need be drawn from the pricked points to the centre of the plot, the only thing necessary is to count the number of equal spaces, adding the fractional value of the last space if smaller than the adjoining spaces. The actual area of the plot is the number of spaces multiplied into the constant for the curve used. Thus, if a plot divides up into 50·5 spaces by means of the larger curve, the area is 50·5 sq. in., and if another plot divides into the same number of spaces by aid of the smaller curve, the area is $50{\cdot}5 \times \frac{1}{2} = 25{\cdot}25$ sq. in.

Supposing the plot measured has been drawn to the scale of 8 ft. to 1 in., or 64 sq. ft. to 1 sq. in., the actual measured area must be multiplied by 64 so as to give the area represented by the drawing.

To facilitate the measurement of the last space where less than the width of the curve at the boundary line of the plot, a proportional scale is engraved on the larger of the two instruments, by which the decimal value required can be readily ascertained.

Referring now to Fig. 2, the procedure is to mark off areas with parallel sides by sliding the curve along the base line of the plot to be measured, pricking off points as before, all the areas being of equal size. The actual dimension of the plot is twice the product of the number of spaces and the constant of the curve. Proportional parts are estimated in the manner already described.

We have tested the areameter, and find it simple and efficient, but the printed instructions for use should be revised, as they do not explain the method of procedure quite so clearly as could be desired.

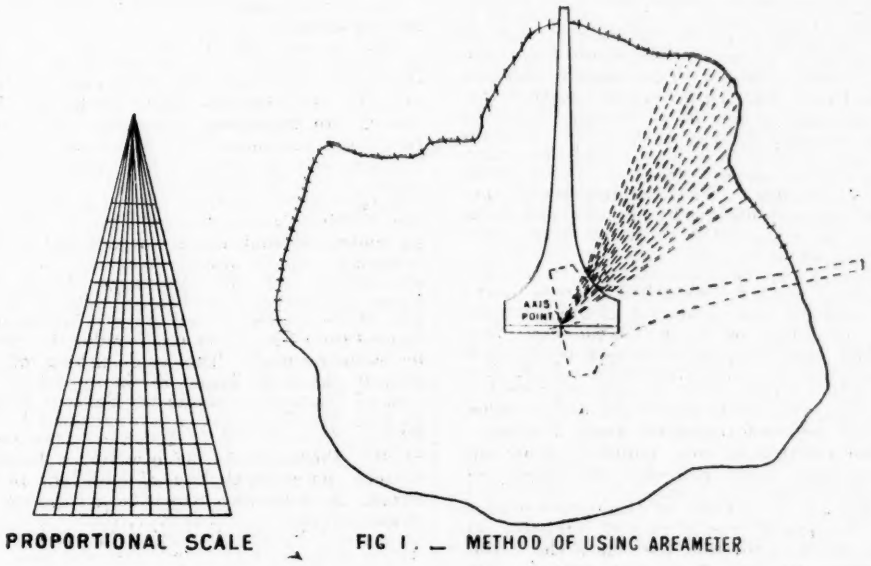


FIG 1. — METHOD OF USING AREAMETER

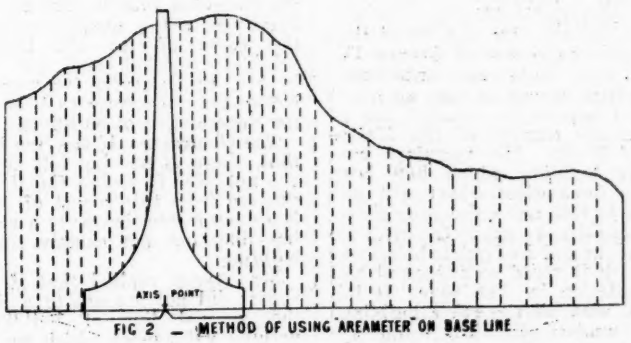


FIG 2 — METHOD OF USING AREAMETER ON BASE LINE

The Areameter.

LONDON COUNTY COUNCIL EDUCATION COMMITTEE.

THE Education Committee of the London County Council met on Wednesday.

Repairs on Schedule Prices.—It was recommended that the tenders of the undermentioned contractors for carrying out at schools repairs on the schedule of prices, with percentages added thereto as respectively stated, be accepted; that the contracts be for a period of one year in the first instance, and do remain in force thereafter until determined by three months' previous written notice on either side, such notice to expire at any time:—

Messrs. W. Silk & Son—Group XIV. (Hackney C. and N.)—(*a*) For repairs, measured work, 15 per cent.; (*b*) for sanitary, measured work, 15 per cent.; (*c*) day work, generally, 10 per cent.

Messrs. W. Johnson & Co., Ltd.—Group XXIII. (Deptford), XXIV. (Camberwell, N.), and XXV. (Dulwich and Peckham)—(*a*) For repairs, measured work, 5 per cent.; (*b*) for sanitary, measured work, 5 per cent.; (*c*) for day work, generally, 5 per cent.

THE TRIBUNAL OF APPEAL.

THE BUILDING LINE OF EUSTON-ROAD.

THE Tribunal of Appeal under the London Building Act on Thursday last week continued the hearing of the appeals by the Metropolitan Railway Company and several freeholders against the certificate of the Superintending Architect of Metropolitan Buildings defining the general line of buildings on the northern side of Euston-road, between Hampstead-road and Osnaburgh-street.

Mr. Avory, K.C., opened the case for the London County Council. He said there were substantially two questions for the Tribunal to deal with. The first was, what was the true effect of the judgment of the Court of Appeal in the case of the Metropolitan Railway upon the facts in the present case? and the second question was, what was the true effect of what was done by the Metropolitan Board of Works and Mr. Vulliamy, the Superintending Architect, in respect of this portion of the Euston-road, in the year 1867? The Tribunal was not sitting to determine what was the most expedient line to which buildings should be allowed to be erected, or which line would do the least injury to owners of property, nor which line would least disturb existing contracts that had been made either under lease or for purchase of any of the property. The only question the Tribunal had to decide was what was at the moment the general building line. They had nothing whatever to do with the effect which their determination might have upon existing buildings; still less had they anything to do with the opinion of the St. Pancras Borough Council as to where the line should be defined. Proceeding to deal with the facts of the case, counsel said that the history of the road commenced with a statute of George II., which came into operation in 1756, under which this new road, as it was then called, was made from Edgware-road, joining the Great North-road at Islington. That original statute provided that no buildings in the new road should be erected within 50 ft. of the roadway, and it went on to provide that any new building so erected should be deemed to be a common nuisance. That Act remained in force until it was repealed and re-enacted in the year 1808. The Act of George IV. which came into force in 1826 specifically enacted that it should be unlawful to erect buildings within 50 ft. from the side of the road. It was important to remember that each one of the Acts to which he had referred contained words limiting it to the erection of new buildings upon new foundations. That probably explained why the Adam and Eve public-house continued to flourish at the corner of Hampstead-road so long, because it was more than probable that it was there at the time the first of the statutes referring to the road was passed. That condition of things continued until the year 1862, when the Metropolis Management Act of that year was passed. By sect. 75 of that Act the provisions of the Act of George IV. were repealed, and there was substituted therefor the familiar provision that no house should be erected beyond the general line of building without the consent of the Metropolitan Board of Works. He therefore contended that any building which had been erected upon a foundation which did not exist in the road in 1750 was unlawfully there, and as far as he could make out by the evidence in the case the Adam and Eve public-house was the only one which it could be suggested had an existing foundation in that year. It followed, therefore, that all the other buildings were on new foundations. That being the law up to 1862, the general line of buildings in this part of the Euston-road must have been 50 ft. distant from the road. If there were any buildings there in 1862 within 50 ft. of the roadway, then they were a common nuisance, and he submitted that a common nuisance could not constitute or go to make up a general line of buildings. After 1862 the position was that no building could be erected beyond that line, which was 50 ft. from the roadway, without the consent of the Metropolitan Board of Works. The Court of Appeal had adopted the suggestion which he (counsel) had more than once put before the Tribunal as to the consents given by the Metropolitan Board of Works and the London County Council. He had contended that the consent to a building being brought beyond the general line of building could not alter the general line of building. The Court of Appeal had now decided very clearly that whether the consent was given under the Act of 1862 or subsequently under the Act of 1894, no building which had been thus consented to could be taken into account by the Tribunal as a building going to make up the general line of buildings in the street—such buildings must be excluded from their consideration and treated as non-existent. He would show what consents had been granted by the Metropolitan Board of Works and the London County Council, and in other cases he would show where the applications had been made and the consent refused upon the basis of the general building line in Euston-road being that which was now defined by the Superintending Architect.

The Chairman: If we are to presume that everything built in front of a line 50 ft. back as having been unlawful, I don't know what we have got to do. It seems to me we have not got to determine the general line of building in this street—we have only got to say that the general line of building was fixed by previous Acts, and therefore there is nothing for us to do.

Mr. Avory said he should quite agree to that subject to the point that there were no buildings which could form any general building line in the Euston-road at all. That duty was thrown upon the Superintending Architect of the London County Council. Proceeding to deal with the point as to the true effect of what was done by the Metropolitan Board of Works and Mr. Vulliamy in the year 1867, counsel said he had not heard Mr. Russell or anybody else at present say that Mr. Vulliamy was purporting to define a general line of buildings in this portion of Euston-road in 1867. He did not know whether counsel for the appellants intended to contend that what Mr. Vulliamy did amounted to a definition of a general building line within the meaning of the Act.

Mr. Russell said that was certainly one of his contentions.

Mr. Avory said his submission was that there was nothing in what took place at that time that conferred any right upon anybody to build up to the line suggested by Mr. Vulliamy. He moreover contended that it certainly did not amount to a definition of the building line as then existing. The only thing which could be suggested to amount to a definition of the general line of building was Mr. Vulliamy's report dated May 9, 1867, and he contended that there was nothing in that document which would bear out such an assumption. All Mr. Vulliamy did in that report was to recommend that the Board should give their consent to buildings being brought beyond their line up to a particular line which he recommended. The real history of the matter was to be found in the report of the case of Baumann and the St. Pancras Vestry. In 1866 Mr. Baumann was summoned by the District Surveyor of St. Pancras as the owner of 316, Euston-road, for erecting a building beyond the general line of buildings in the street. A conviction was obtained before the police magistrate, which conviction was upheld on appeal by Chief Justice Cockburn. Mr. Avory then went at length into the case, and said the history of the proceedings clearly demonstrated that in 1867 the general line of buildings in the Euston-road was the line of the front of the old buildings as they originally existed, and that was determined by Mr. Vulliamy for the purpose of that case before the magistrate as being the then existing general line of buildings in that road.

The Chairman: If the line is determined by that, there is nothing left for us to do; we are not here to define the line. As far as I can see from this report of Mr. Vulliamy, it is a mere suggestion as to a very proper building line, but not exactly settling a line of building.

Mr. Avory replied that if Mr. Vulliamy's report did not amount to a determination of the general line of buildings, there was nothing subsequent which could do it.

Mr. Chalmers, an assistant in the Architect's Department of the London County Council, spoke to having made a survey of the houses on the north side of Euston-road, between Hampstead-road and Osnaburgh-street, and said that it was from his survey that the Superintending Architect had made his plan in the case.

The proceedings were again adjourned.

The Tribunal continued the hearing of the case on Friday, when Mr. Chalmers was cross-examined at considerable length regarding the accuracy of the plan which he had prepared.

Mr. Bartley Dennis put it to the witness that, according to Mr. Vulliamy's plan, many of the forecourts were covered with one-story buildings right up to the houses, and that in all those cases it was one continuous building, with no frontage showing between the two; but witness refused to accept this. He maintained that he had made a proper survey for the purpose of preparing his plan, but he admitted that he did not go over all the houses.

Considerable discussion took place between the parties as to whether certain of the buildings in the road were three or four stories high, and the Chairman said that as some importance was attached to the point the Tribunal would like something accurate which they could put before a higher court in the event of an appeal against their decision.

Eventually it was agreed that Mr. Chalmers, Mr. Eason, and Mr. Garbutt, as representing the various interests, should go to the premises and make an inspection and prepare a plan, to be agreed upon, showing the number of stories of each building or part of building from Osnaburgh-street to Hampstead-road.

Mr. W. N. Blair, District Surveyor to the St. Pancras Borough Council, identified a letter dated November 27, 1866, from Mr. Scott, who was then Surveyor to the Vestry, to Mr. Vulliamy, in respect to an application by Mr. Baumann relating to 316, Euston-road, asking for his decision of the line of frontage in Euston-road from Hampstead-road to Ossulton-street.

Mr. Avory said he put the letter in to show that the line which Mr. Vulliamy defined in response to the request it contained was the line between Hampstead-road and Osnaburgh-street—Ossulton-street being obviously a mistake in the letter. His suggestion was that the original line of buildings was the general line.

Mr. Alfred Millwood, from the Superintending Architect's Department of the London County Council, said he had caused a most careful inquiry to be made to ascertain whether any written certificate by Mr. Vulliamy in respect to Mr. Baumann's application in 1866 existed, but had failed to find one. He also spoke to having caused inquiries to be made to find out all the "consents" that had been given by the Metropolitan Board of Works, and afterwards by the London County Council in respect of buildings on the north side of Euston-road, between Hampstead-road and Osnaburgh-street. Altogether he found that eighteen applications had been submitted. Some were refused and some granted.

After some argument Mr. Avory was allowed to put in a map of London by Horwood, dated 1819, which he said showed that there were at that time no buildings on the forecourts of the houses at the spot in question, with the exception of the Adam and Eve public-house.

Mr. Russell remarked that he had a map, published by Thompson's in 1804, which showed along the line of the Euston-road buildings which did not exist in the map put in by Mr. Avory. As far as he could see he did not think either of the maps would be of the least use to the Tribunal in arriving at their decision.

Mr. Avory, in summing up the case for the London County Council, said he suggested that the documents that had been put in showing what took place in 1867 were conclusive evidence that at that time the general line of buildings in this part of the Euston-road was the fronts of the old buildings, standing approximately 50 ft. back from the road. Any conversion of those one-story shops, either with consent or without consent, into three or four story buildings could not alter the general line of buildings as it existed in 1867. With reference to the prolongation of the line into Osnaburgh-street and Hampstead-road, if that was open to any objection the Tribunal could cure it by stopping the line at the particular houses through which it was said to run. He would, however, ask the Tribunal to carry the line into the Hampstead-road.

The Chairman said he was afraid Mr. Avory was asking them to go beyond their powers.

Mr. Avory said, of course, if the Tribunal felt any doubt about the matter they would cut off the line at the Euston-road, but he should have thought they would have been within their right in prolonging it as suggested.

Mr. Russell, addressing the Tribunal, contended that Mr. Vulliamy decided the general building line in 1867. Although there had

been modifications in the character of the buildings since then, there had been no material alteration with regard to the position of the fronts of the buildings. With respect to Mr. Avory's contention that these buildings were unlawfully where they were because they were built upon new foundations, he submitted there was absolutely no evidence in support of such a contention. He asked the Tribunal not to exclude those buildings from their consideration when settling the general building line.

Mr. Bartley Dennis, having addressed the Court,

The Chairman said the Tribunal would have to consider very carefully its decision. They would announce it to the parties without drawing it up definitely, which would give those interested an opportunity to attend before them so as to make an application regarding the costs.

COURT OF COMMON COUNCIL.

THE usual fortnightly meeting of the Corporation was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Widening of Fleet-street.—The Improvements and Finance Committee, reporting on the proposal to complete the widening of Fleet-street, recommended that the offer of the London County Council to contribute a sum not exceeding 200,000*l.*, based on the Council's estimate of 400,000*l.*, towards the cost of making Fleet-street 60 ft. wide in front of Nos. 13, 14, 15, 16, 21, 22, 47, 49, 50, 52, 54, 55, 55A, 57, 58, 60, 61, 62, 68, 70, 72, 73, 74, 75, 77, 78, 80, and 81, be accepted, subject to the Corporation reserving the right to apply for a further contribution in the event of the Council's estimate of 400,000*l.* being exceeded (Corporation's estimate, 436,238*l.*). — Mr. Brinsley-Harper opposed the report, and moved that it be referred back to the Committee. The London County Council, he said, had agreed to contribute half the cost, but now limited their offer to 200,000*l.* The estimate of 400,000*l.* was unduly low, and it was not improbable that the cost would be 500,000*l.*, with the result that the Corporation would be involved in an additional expenditure of 100,000*l.*—Mr. Lile, in supporting the Committee, said that while it was true that an understanding was come to with the Council some years ago as to the payment of half the cost of the work, that was applied when the occasion arose by the falling-in of leases. Unfortunately that policy of waiting had increased the cost by thousands of pounds. If the work was not carried out now, it would cost a great deal more in the future, and he urged the Court to accept the Council's terms. —Mr. Bower also supported the Committee's recommendation, and said that if the scheme were shelved for another two years it would add 10 or 15 per cent. to the cost.—Mr. W. H. Key stated that the original agreement with the County Council did not include trade compensation.—On a show of hands the amendment was lost.—Mr. Deputy Wallace then moved a further amendment to the effect that the matter should be referred back, with an instruction to the Committee that the estimated cost should not exceed 400,000*l.*—Mr. Davies, in seconding, argued that the improvement was a metropolitan one. He had gone into the figures, and had found that under the proposed agreement the Corporation would pay 261,000*l.* and the Council only 175,000*l.*—The amendment was lost, and the report of the Committee adopted.

Bishopsgate-street.—The Improvements and Finance Committee submitted an arrangement for acquiring the freehold interest in the premises, No. 121, Bishopsgate-street Without, for the sum of 2,438*l.*, for widening purposes. They also recommended that notices be served to acquire the ground needed to widen the public way in front of the building between Nos. 123 and 126, Bishopsgate-street Within, and No. 126, Bishopsgate-street Within, and No. 61, Cornhill; the adoption of an arrangement for effecting an improvement in front of No. 61 to No. 64, Cornhill, on the principle of give and take; and that a copy of the plan of the proposed improvement be forwarded to the London County Council, and they be asked to contribute half the net cost of carrying out the same.—The Court approved.

Leadenhall-street.—Mr. John Lulham Pound moved that it be an instruction to the Improvements and Finance Committee to report fully to this Court as soon as possible as to the desirability or otherwise of widening Leadenhall-street at the eastern end, a portion of the roadway there being only 17 ft. wide.—The motion was adopted.

Proposed Additions to the Guildhall.—Mr. Hayward Pitman presented a report from the City Lands Committee on the proposal to expend a sum of 3,800*l.* on the erection of an addition of three stories over the library corridor on the east side of the porch, together with the opening up and clearing of the crypt (to render it suitable for use as an adjunct to the museum), and the utilisation of certain vaults under Guildhall as strong-rooms. Mr. Pitman said he hoped the matter would not be reopened, as it had already been fully discussed. He had received letters approving the scheme from the Society for the Protection of Ancient Buildings, and the Royal Institute of British Architects.—After some discussion the report was adopted.

PROJECTED NEW BUILDINGS IN THE PROVINCES.

ABERTILLERY.—Swimming-bath, etc.; Messrs. Powell's Tillery Workmen's Institute, Abertillery.

Aylburton.—School; Mr. R. S. Phillips, architect, The Cross, Gloucester.

Barking.—The Urban District Council has passed the following plans:—Two houses, Eastbury-avenue, for Mr. J. Graffy; three shops, Ripple-road, for Mr. G. A. Smith.

Barnsley.—School; Messrs. Union & Co., builders, Ecclesfield, Sheffield.

Belmont (Surrey).—New church of St. John the Baptist (6,000*l.*); Rev. W. A. Cunningham.

Blyth.—Rink; Manager, Blyth Skating Rink Company.

Bristol.—Additions to Castle school; Messrs. Ridd & Sons, builders, Bristol.

Bromley (Kent).—Secondary school (10,000*l.*); Messrs. Cook & Son, builders, Crawley.

Burbage.—Children's home; the Guardians, Hinckley, Leicester.

Cheadle.—School; Mr. H. Hutchings, architect, Shire Hall, Stafford.

Cowie.—Rink; Mr. J. Burnett, architect, Stonehaven.

Crook.—School; Mr. T. Rushworth, architect, Shire Hall, Durham.

Dover.—Skating-rink; Mr. H. Dan, architect, Faversham.

Drumoak.—Library; Messrs. Walker & Duncan, architects, Golden-square, Aberdeen.

Dundee. — Offices; Northern Agriculture Company, Ltd., Dundee.

Enniskillen.—Thirteen houses; Surveyor, Rural District Council.

Essington.—School; Mr. H. Hutchings, architect, Shire Hall, Stafford.

Folkestone.—Rink; Mr. H. Dan, architect, Faversham.

Glasgow.—Rink; Mr. W. W. Morton, architect, Rutherglen.

Gringley-on-the-Hill.—Restoration of church (2,000*l.*); Mr. Curry, architect, Market-place, Derby.

Hanwell.—Alterations and additions to Council's offices (1,750*l.*); Messrs. H. F. Green & Co., builders, 217A, Upper Thames-street, E.C.

Keith.—Hall, Chapel-street; Mr. W. F. Stewart, architect, Fife-Keith.

Langdale (Cleveland).—Workman's institute, for Messrs. Pease & Partners, Langdale.

Leatherhead.—School; Messrs. Jarvis & Richards, architects, 10, Queen Ann's-gate, S.W.

Litherland. — Church hall; Vicar, St. Andrew's Parish Church.

Lower Gornal.—Mission church; Mr. A. Ramsell, architect, Sedgley.

Maidstone.—Additions to Town Hall; Messrs. R. Corben & Co., builders, Maidstone.

Manchester.—Moss Side Mills, for Messrs. Fry, Binns, & Co., Manchester.

Middlesex.—Sanatorium (3,000*l.*); Colonel Gerard Clark, 4, Sussex-gardens, Hyde Park, W.

North Ormesby.—Extensions to hospital; the Guardians, North Ormesby.

Orsett. — Workhouse buildings (5,000*l.*); Messrs. Brown & Co., builders, Grays.

Penmaenmawr.—Club-house; Penmaenmawr Golf Club.

Ponthenry.—School; Mr. V. Morgan, architect, Carmarthen.

Stoke-upon-Trent.—The Town Council has passed a plan, lodged by Mr. W. Ball, for four houses in Oak Hill-avenue.

Taunton.—Domestic centre; Mr. C. Reilley, architect, County Offices, Aylesbury.

Tything (Worcester). — Garage; Messrs. Parkins & Co., City Garage, Worcester.

Wallsend.—Additions to hospital: Mr. J. F. Davidson, architect, Station-road, Wallsend.

Warmley.—Additions to St. Barnabas Church; Mr. H. Hirst, architect, Broad-street, Bristol.

Worcester.—Banking premises; Manager, London, City, and Midland Bank, 3, Threadneedle-street, E.C.

Worksop.—One hundred villas, Garden City; Secretary, Worksop Co-operative Society.

Washford.—Mission church; Rev. G. Weigell, Old Cleeve, Somerset.

Watford (Herts).—The Urban District Council has passed the following plans:—Six cottages, Prince's-avenue, for Messrs. F. C. & A. E. Keen; seven houses, Hagden-lane, for Mr. T. Rolfe; pair of villas, Leavesden-road, for Mr. E. Howard; three pairs of villas, Leavesden-road, for Mr. H. Everitt; sixteen cottages, Sandringham-road, for Mr. J. Bonham; two semi-detached houses, Oxhey-avenue, for Mr. W. A. Jones.

Wotton. — Church (1,500*l.*); Gloucester Church Extension Society.

LONDON AND DISTRICT BOROUGH COUNCILS.

Battersea.—The following plans have been passed:—Price's Patent Candle Company, Ltd., workshop at Belmont Works, York-road; Messrs. Mountford & Clapham, additions to Battersea Polytechnic in Lurline-gardens and Battersea Park-road; Mr. W. Nash, restaurant at 34, St. John's-road; Mr. W. J. Renshaw, sixty-six houses in Muncaster-road and Culmstock-road, on the Battersea Rise House Estate.

East Ham.—A central coal-house and general store are to be erected in connexion with the hospital, and various other additions and alterations are to be carried out. It is proposed to pave the highway margins of Barking main road with wood blocks and granite setts, at a total estimated cost of 16,312*l.* The following plans have been passed:—Mr. G. Saxton, nine houses and one shop, Kempton-road; Mr. T. Watson, eleven houses, Hubert-road; Mr. R. L. Curtis, conversion of pupil teachers' centre and education offices into higher elementary school; Mr. W. J. Cottle, ten houses, Mafeking-avenue; Mr. J. Clark, seventeen houses, Bedford-road.

Hammersmith.—Tenders are to be invited for the making-up of the first section of Wormholt-road as a new street.

Kensington.—Mr. Joseph Latter is to make up an extension of Oxford-gardens as a "new street," the contract price being 1,123*l.* Thirty siphon-trapped pan gullies are to be substituted, at a cost of 90*l.*, for gullies in Drayton-gardens, of an obsolete type.

Lewisham.—Tenders are to be invited for paving and forming Levendale-road. Thornwood-road, Manor Park, is also to be formed and paved, at an estimated cost of 724*l.* The following tenders have been accepted for kerbing, etc., roadways:—Chalcroft-road, Messrs. Fry Brothers, 698*l.*; Nyon-street, Messrs. H. Woodham & Sons, 265*l.*; Gaynesford-road, Mr. W. Pearce, 453*l.* Messrs. Apthorpe & Co. are to pave the footpaths in the foregoing streets with artificial stone at 2s. 11½d. per yard super. The following plans have been passed:—Messrs. Greenaway & Newberry, vicarage and parish hall, Clarendon-road; Mr. W. Allam, twenty houses, Ewhurst and Manwood roads; Mr. H. R. Hunter, thirty-six houses, Tannsfield-road; Mr. J. H. Beeley, seven houses, Malyons-terrace; Mr. James Watt, twelve houses and shops, Bromley-road; Mr. T. H. Sawyer, laundry, Huxbear-street.

Poplar.—The Borough Council have passed plans for Messrs. Todd & Newman for additions to the Duke of Wellington beerhouse.

St. Pancras.—The General Purposes Committee have passed plans lodged by the Foundling Hospital authorities to build shops on the site of existing old stables in the Gray's Inn-road, opposite the Royal Free Hospital. The Borough Council are to bear the cost (175*l.*) of paving works in connexion with the improvement.

Southwark.—The whole of the street gas-lamps in the borough are to be fitted with new inverted burners, while double inverted burners are to be substituted for the present compressed gas lights at London Bridge Approach.

West Ham.—The following plans have been passed:—Mr. E. J. Jenner, eight houses, Idmiston-road, Forest Gate; Mr. W. Wyles, four houses, Stirling-road, and two houses, Broadway, Plaistow.

Westminster.—Paving works and alterations to cables, mains, pipes, etc., to cost altogether 1,000*l.*, are to be undertaken in connexion with a widening of the carriageway of Waterloo-place, near Charles-street. The land is to be given free of charge.

POST-OFFICE BUILDING, BLACKROCK, CO. DUBLIN.—A new post-office has been opened at Blackrock. The structure was built at a cost of 5,000*l.* The materials are Irish, the granite coming from the quarries of Messrs. Freeman, Ballyknocken, the facing bricks from Arklow, and the stock bricks throughout from Dolphin's Barn. The building is fireproof, the floors and roof are mainly composed of concrete, reinforced with steel, and the roof covered with "national" asphalt. The architect of the building was Mr. Howard Pentland, B.A., F.R.I., R.H.A., and the builders Messrs. G. W. Scott & Co.

General Building News.

KIRKBY MALZEARD CHURCH.

This ancient church, which was badly damaged by fire early in 1908, has been restored. In the work of restoration, as much of the old stone as was possible has been used, but the greater part is new. All the pillars of the nave have been renewed. The new oak roofs have been erected of the same low pitch as that adopted by Sir Arthur Blomfield in the chancel when he restored the church about thirty years ago, and the lowering of the roof of the nave has added to the dignity of the tower. New floors have been laid, that of the chancel being of marble. The bells have been recast by Messrs. Gillett & Johnson, of Croydon, and a new clock has been placed in the tower by Messrs. Potts & Sons, of Leeds. The new organ in the north choir aisle is to be built by Messrs. Brindle & Foster, of Sheffield. Messrs. Barker Brothers, of Hampsthwaite, have been contractors for the greater part of the work; Mr. J. H. Coldbeck, of Ripon, for the woodwork; and Mr. W. E. Dixon for the hot water. Some wood screens have been designed by the architect, Mr. J. Oldrid Scott, for the chancel and tower arch, but these cannot at present be undertaken for want of funds. The work has involved an expenditure of 5,500*l.*

CHURCH IMPROVEMENTS, COPDOCK.

At St. Peter's Church, Copdock, an organ-chamber, vestry, gallery, and Litany desk have been erected. Messrs. Brown & Burgess were the architects for the improvements, Messrs. Cubitt & Gotts the builders, whilst the organ is in the hands of Messrs. Lewis & Co., of Brixton. A new heating apparatus has been installed by Mr. Warner, of Ipswich

CHURCH RESTORATION, TREDUNNOCK, MON.

An effort is being made to raise the funds necessary to carry out a scheme of restoration to the ancient parish church at Tredunnock. It is estimated that a sum of 1,000*l.* will be required. Mr. Arthur Grove, of London, is acting as architect in the matter.

TOWER, APPLEDORE CHURCH.

The Bishop of Exeter opened and consecrated a few days ago the new tower of the parish church and other extensions carried out recently at a cost of about 2,300*l.* The tower, which is provided with a clock, is of Cornborough stone. Internally the church has been renovated. Mr. John J. Smith, of Bideford, was the architect.

ENFIELD GRAMMAR SCHOOL.

Additions have been made to the Enfield Grammar School, at a cost of 7,500*l.* The enlargement includes an assembly hall, five classrooms, a science-room, a library, and a common-room, and was designed by Mr. H. G. Crowthall, Architect to the County Committee.

SCHOOL, MERTHYR.

Mr. Enoch Morrell, J.P., Chairman of the Merthyr Education Authority, opened a new infants' school at Penydarren recently. The new building, which is adjacent to the old premises, has been erected from the designs of Mr. J. Llewellin-Smith, the authority's architect, at a cost of about 5,300*l.*

SCHOOL PLANS, KEIGHLEY.

The Buildings Subcommittee have submitted a recommendation that Messrs. Moore & Crabtree (Keighley) be invited to send in plans for a proposed new mixed school at Highfield. Mr. J. J. Brigg, in moving the adoption of this, explained that the architects mentioned prepared the original plans for this school fifteen years ago, but only the infants' department of the school had been proceeded with. Mr. J. W. Smith seconded the motion. Alderman King moved an amendment that competitive plans for the work be invited from Keighley architects. The amendment was lost by the casting vote of the chairman, and the Subcommittee's recommendation was carried on the understanding that Messrs. Moore & Crabtree should be asked what their charge would be in case their plans were rejected.

GIRLS' SCHOOL, BARNSLEY.

A new high school for girls has been erected at Barnsley, at a cost of about 25,000*l.*, on the Huddersfield-road. The school has been erected from the plans of Messrs. Buckland & Farmer, of Birmingham, chosen among fifty-eight designs in open competition. The concentration of the sixteen classrooms adjacent to the assembly hall on the ground floor is perhaps the most conspicuous feature of the design. The main entrance is by a wide range of steps, and on either side of the entrance hall are governor's and head mistress's rooms, and across the corridor is the assembly hall, 70 ft. by 35 ft., with the classrooms on either side. On the lower ground floor the gymnasium is below the assembly hall, and on the right are rooms devoted to domestic science, cookery, for dining the scholars, and caretaker's quarters; and on the other side of the block are the cloakrooms, sick-room, music-room, etc. The laboratories are placed on the upper floor. There is a kindergarten section on the lower floor, and entrances on either side of the block. The lighting is by electricity. The building is of brick with stone dressings.

COUNCIL SCHOOLS, ASFORDBY.

A new Council school has been erected at Asfordby Hill. Mr. E. Shelbourn, of Melton Mowbray, was the architect, and the contractors were Messrs. W. Corah & Sons, of Loughborough. The school has two entrances, one for the boys and one for the girls and infants. On either sides of the entrance halls are cloakrooms, which lead into a central hall 50 ft. by 26 ft. Surrounding the central hall are three classrooms, infant-room with a folding partition between, and on the north wing is a general classroom, while on the north side provision is made for further extensions.

COUNCIL SCHOOL, BIRKENHEAD.

The Birkenhead Education Committee are building a new school in Brassey-street. The approximate cost of the building will be 18,000*l.*, and it is being erected to the plans prepared by Mr. T. T. Rees, Architect to the Education Committee.

COUNCIL SCHOOL, APPLEDORE.

New Council elementary school buildings at Appledore, erected at a cost of 3,000*l.*, were opened on the 20th inst. The plans were prepared by Mr. Morris, the Devon County Education Authority's Architect, and Messrs. Cole, of Plymouth, have been responsible for the building, which will accommodate 270 scholars.

TECHNICAL INSTITUTE, CORK.

Work has commenced in the erection of the new Crawford Municipal Technical Institute, Fitton-street. The architect is Mr. Hill. The cost of the building will be about 16,000*l.* Mr. Samuel Hill is the contractor. The institute will be 260 ft. long and 300 ft. deep. There will be about twenty-nine departments.

Y.M.C.A. BUILDINGS, NEWPORT, MON.

Lord Tredegar recently opened the extended buildings of the Newport Y.M.C.A. in Commercial-street. The premises have been erected on a site adjoining the older buildings. The whole of the new buildings are of fireproof construction. The work has been carried out by the contractor, Mr. Charles Reed, of Malpas-road, under the personal supervision of the architect, Mr. Charles E. Compton, of the firm of Habershon, Fawckner, & Co., Newport, and at Cardiff. Mr. Eynon acted as clerk of works. The total outlay amounted to nearly 5,000*l.*

NEW CATTLE MART FOR EDINBURGH.

At the Edinburgh Dean of Guild Court on the 18th inst. plans were passed for a cattle mart at Gorgie, for Messrs. Oliver & Son, Ltd. The building, which will be in one block, will be of brick, and will be roofed in in four spans. Roughly, it will cost about 12,000*l.* Messrs. Cooper & Taylor, Edinburgh, are the architects.

ALMSHOUSES, BURY ST. EDMUND'S.

On the site of the former College Gate Works, Bury St. Edmund's, a block of twenty almshouses have lately been erected on three sides of a quadrangle, the other side being open to College-lane. There are twelve bungalow houses, and eight in a two-story block. Messrs. Mason & Son, of Haverhill, were the general contractors. The wrought-iron gates and railings were made by Messrs. F. Clubb & Son, of Sudbury, who also supplied, altered, and fixed the old wrought-ironwork used for the balcony. Mr. A. Ainsworth Hunt, of Bury St. Edmund's, was the architect.

ROLLER SKATING-RINK, ELGIN.

A roller skating-rink has been opened in this town. The work of erection has been carried out by Messrs. Davidson & Hay, Elgin (masons); Messrs. D. Macandrew & Co., Aberdeen (carpenters); Mr. James Ross, Elgin (plumber); and Messrs. Kintrea & Son, Elgin (painters); while Mr. Pratt, architect, was responsible for the plans.

RESIDENCE, NORWICH.

A residence, built entirely of hollow concrete blocks, has been erected on a site adjoining Heartsease-lane, facing Mousehold. The blocks were made with a machine supplied by the Concrete Machinery Company, Ltd., of Liverpool. The house is covered in by "Ebonoid" flexible roofing, laid as a flat, coated with gravel. Mr. E. Haydon, builder, of Norwich, carried out the work from designs and under the supervision of Mr. Albert C. Havers, architect, of Norwich.

A YEAR'S BUILDING IN PAISLEY.

At a recent sitting of Paisley Dean of Guild Court, Dean of Guild M'Callum submitted the statement for the past year. There had been seventy-four cases brought forward for disposal, as compared with fifty-eight the previous year; while the valuation was estimated at 90,260*l.*, as compared with 85,630*l.* The classification of the passed property showed fourteen four-story tenements, five three-story tenements, fourteen villas and cottages, halls, and public buildings, the remainder being made up with alterations to property and additions to public works. Permits were granted in twenty-seven minor cases by the Master of Works, as compared with thirty-eight the previous year.

GLASGOW SUBURBAN BUILDING.

At a meeting of the Buildings Committee for the First or Upper District of the county of Renfrew it was intimated that plans had been lodged for the erection of the following buildings:—Double villa at the corner of Calderwood-road and Kilmarnock-road, Newlands, for Messrs. Train & Taylor, Dalmarnock Bridge, Rutherglen; double villa in Southbraedrive, Jordanhill, for James Watson, 494, Crow-road, Partick; villa in Busby-road, Giffnock, for John Whitewright, 15, Carolside-gardens, Clarkston; two-story tenement in Beith-road, Elderslie, for William Storrier, Gleniffer View, Elderslie; and two double cottages in Kilmarnock-road, Newton-Mearns, for Messrs. Young & Pollock, 134, Main-street, Barrhead.

DR. BARNARDO'S HOMES.

The Council of Dr. Barnardo's Homes have the option of purchasing within three years for 6,000*l.* an estate at Woodford Bridge, Essex, known as Gwynne House, and consisting of a fine old building with extensive offices and 39 acres of land, which they propose to acquire with a view to developing it into a boys' garden city. The buildings erected on the estate can be partly adapted, but others must be built. The estate has been surveyed by Mr. William A. Pite, and by Mr. Charles T. Walrond, and the former has embodied a scheme for a garden city in plans and elevations. It is not intended that the houses in the garden city should be uniform in appearance or style, or planted in rows; each building will be self-contained and separate from its neighbour. Provision will be made for a church and for an isolation hospital, and there will be a swimming-bath near the bottom of the estate. The architect's plan shows twenty-eight houses with thirty beds each, providing for a community of 840 boys when all the beds are occupied. The cost per house works out at 1,800*l.*, including furniture. It is hoped, therefore, to build them at the cost of 60*l.* per bed. Altogether, however, at least 8,000*l.* will be required to free the estate and develop it to the point when the first house may be begun.

Sanitary and Engineering News.

WIDENING OF ELY BRIDGE, CARDIFF.

Mr. H. R. Hooper, M.Inst.C.E., Local Government Board Inspector, held an inquiry at the Cardiff City Hall a few days ago regarding the joint application of the Glamorgan County Council and the Cardiff Corporation for loans to widen and rebuild the Ely Bridge over the River Ely. Mr. J. L. Wheatley explained that the total loan required was 7,250*l.*, of which equal shares would fall on both authorities. The bridge is now 20 ft. wide, and it is proposed to make it 50 ft. There was no opposition.

WATER SUPPLY, HASTINGS.

The Hastings Corporation, on the 19th inst., decided to promote a Bill in Parliament to enable it to borrow 130,000*l.* for an increased water supply. It is also proposed to effect improvements in the borough.

DRAINAGE SCHEME, LITTLE HEATH, HERTS.

An inquiry was held recently by Mr. H. A. Reed, an Inspector of the Local Government Board, into an application by the Hatfield Rural District Council for sanction to borrow 7,000*l.* for the purpose of sewerage and sewage disposal works for Little Heath, on a site proposed to be purchased in Swanley Bar-lane. Mr. Baldwin Latham, who is acting as consulting engineer to the Council, explained the technical details of the proposed scheme.

PROPOSED NEW WATER SUPPLY, ABERDEEN.

The Corporation of Aberdeen intend to apply to Parliament in the ensuing session for power to take a water supply from the River Avon, Banffshire, by means of forming an impounding reservoir on the river at that point. It is proposed to convey the water by

pipes through the parishes of Kirkmichael, in Banffshire, and Strathdon, and other parishes, in Aberdeenshire, to a reservoir at Wardhead, about three miles west of the city. From Wardhead the water would be distributed to the existing reservoirs at Pitfodels, Slopefield, and Mannofield. The length of the aqueduct is fifty-two miles, and the supply contemplated is ten million gallons per day. The works, it is expected, will occupy about ten years, and the cost is estimated at 1,068,000*l.*

EXTENSION TO GASWORKS, CARDIFF.

The Cardiff Gas Light and Coke Company, Ltd., have erected a new purifying apparatus. The building which houses the plant is divided into two sections. The purifying-house proper (which contains the apparatus) is 153 ft. long by 28 ft. high to the eaves, and is formed of rolled steel joist stanchions braced together with two lines of lattice girders. The lime and oxide house, where the material is stored and prepared ready for use, is 60 ft. long by 73 ft. wide by 20 ft. high to the eaves, and is built of brickwork, the inner wall forming the end of the purifier-house. The new purifiers are six in number, four being 50 ft. by 30 ft. by 5 ft. deep, and two 40 ft. by 30 ft. by 5 ft. deep. Messrs. John Aird & Sons, Ltd., of London, carried out the foundation and brickwork, and Messrs. Willey & Co., Ltd., of Exeter, were the contractors for the purifying plant, together with the steel and iron work of the building.

WATERWORKS EXTENSION, CAMBORNE.

The Camborne (Cornwall) Water Company, Ltd., are increasing the capacity of their works by the construction of a new reservoir to hold four million gallons. The reservoir is built on the decomposed granite formation, interspersed with ancient mine workings. The long dam forming three of its sides has been built entirely of reinforced concrete, with sheets of expanded steel as a reinforcement. The dam itself is an oblique plane in a series of bays, in which the principle of girder and double cantilever under gradually increasing loads has been predominant. Behind this, and at 10 ft. intervals, counterforts of heavy profile have been built on continuous foundations, forming a complete structure, with a stability of over three times the overturning forces. To bring the whole of the company's works to completion, the system of distribution mains is being reorganised, and includes a complete scheme of water-waste detection by Deacon's meters. The company a few years ago sought the advice of Mr. S. C. Chapman, A.M.Inst.C.E., of Torquay, as to the condition of their undertaking, and have proceeded on the lines of his report. Mr. F. W. S. Stanton, A.M.Inst.C.E., of Chatham and Bristol, was subsequently called in to design and carry out the works.

NEW DOCK, SWANSEA.

The opening of the new King's Dock at Swansea took place on the 23rd inst. The dock has cost about 2,000,000*l.*, and it will accommodate the largest vessels afloat. Its water area is 68 acres, with provision for still further extension. The contract for the work was signed on June 11, 1904, and by its early completion, we learn, the contractors will have earned a bonus approximating 20,000*l.* By its construction an area of nearly 400 acres has been reclaimed from the sea, and valuable sites provided for works which require to be abutting on the docks. The engineers were Messrs. P. Walter Meik & A. O. Schenk, and the contractors Messrs. Topham, Jones, & Railton.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

Messrs. Coussens & Rothwell, architects and surveyors (Hastings), have removed their offices from 25, Havelock-road to 5, Cambridge-road, Hastings.——Mr. A. E. Richardson, for the past six years chief assistant with Mr. Frank T. Verity, F.R.I.B.A., has entered into partnership with Mr. C. Lovett Gill, A.R.I.B.A., practising as Messrs. Richardson & Gill, 46, Gt. Russell-street, W.C.——The Falkirk Iron Company have removed from 67, Upper Thames-street to Craven House, Kingsway, London, W.C. Telephone: Gerrard 9482.

BUILDING OPERATIONS AT CLYDEBANK.

At Clydebank Dean of Guild Court on the 15th inst. Messrs. Robert M'Alpine & Sons presented plans for the formation of a new street and for the erection of five blocks of houses in Second-avenue, Radnor Park. The Provost asked if the roofs were to be of red slates or tiles, as shown in the plans. Mr. Murray, who represented the petitioners, said he could not say, though he did not think the Court had anything to do with that. The Provost: Red roofs look so much better. Mr. Murray: Well, of course, we did not know the artistic temperament of the Court. In further discussion the Provost desired to know what kind of slates were to be used, but Mr. Murray said that the details were no more settled than the kind of paper that was to be put on the walls. On the Provost pointing out that the plans would not be passed until they had full information as to the kind of buildings to be erected a definite promise was given, and the application was agreed to.—*Glasgow Herald.*

CHURCH BUILDING SOCIETY.

The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on the 18th inst. at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Coventry, St. Margaret, 100*l.*; Goodwick, St. Peter, Pembs, 100*l.*; Laira, St. Mary the Virgin, near Plymouth, 100*l.*; Mitcham, St. Mark, Surrey, 145*l.*; Palmer's Green, St. John, Middlesex, 120*l.*; Whiston, St. Mildred, near Cheadle, Staffs, 35*l.*; and West Bromwich, The Good Shepherd, Staffs, 135*l.*; and towards enlarging or otherwise improving the accommodation in the churches at Grainthorpe, St. Clement, Lincs, 25*l.*; Greenfield, Holy Trinity, Flints, 20*l.*; Haxby, St. Mary, near York, 25*l.*; New Brighton, Emmanuel, Cheshire, 80*l.*, making in all 200*l.*; Slough, St. Mary, Bucks, 100*l.*; Tetford, St. Mary, Lincs, 20*l.*; and Birchington, All Saints, Kent, 25*l.* Grants were also made from the Special Mission Buildings Fund towards building mission churches at Barnt Green, Church of the Ascension, near Alvechurch, Worcs, 25*l.*; and Danebridge, St. Paul, near Northwich, Cheshire, 20*l.* The following grants were also paid for works completed:—Hasbury, St. Margaret, Staffs, 150*l.*; Rotherfield Peppard, All Saints, near Henley-on-Thames, 10*l.*; Digby, St. Thomas à Becket, near Lincoln, 15*l.*; Llanfihangel Rhosycorn, St. Michael, Carms, 20*l.*; Dengie, St. James, near Southminster, 10*l.*; Horsington, All Saints, Lincs, 10*l.*; Tetbury, St. Mary Magdalene, Glos, 20*l.*; Kentish Town, St. Benet and All Saints, Middlesex, 100*l.*; York, St. Barnabas, 25*l.*; Stalling Busk, Yorks, 30*l.*; Old Romney, St. Clement, Kent, 25*l.*; Wimbledon Park, St. Luke, Surrey, 100*l.*; Llanbradach, All Saints, near Cardiff, 150*l.*; Great Ness, St. Andrew, near Shrewsbury, 20*l.*; Boxford, St. Andrew, near Newbury, 35*l.*; Lansdowne, Holy Trinity, near Burton-on-Trent, 25*l.*; Mansfield, St. Lawrence, Notts, 100*l.*; South Wimbledon, St. Andrew, Surrey, 150*l.*; Chopmell, St. John, Co. Durham, 50*l.*; Twickenham, All Saints, Middlesex, 25*l.*; Longwell Green, All Saints, near Bristol, 80*l.*; and Minworth, St. George, near Birmingham, 20*l.* In addition to this the sum of 916*l.* was paid towards the repairs of forty-four churches from trust funds held by the Society. The Society likewise accepted the trust of sums of money as repair funds for the churches of St. Paul, Walkden Moor, near Manchester; Holy Trinity, Parkfield, Lancs; and Llansaintffraidglan-Conway.

STREET WORKS, MORECAMBE.

At the Municipal Offices, Morecambe-street, a few days ago, Mr. A. G. Drury, C.E., an inspector of the Local Government Board, held an inquiry into the application of the Town Council to borrow 8,670*l.* for the purpose of widening and improving Marine-road from the Winter Gardens to the West End Pier, including the construction of a new seawall. Mr. Hipwood is the Borough Engineer.

MUNICIPAL AND HEALTH EXHIBITION.

A meeting of municipal officials and others interested in local government was held at the Holborn Restaurant on November 19, for the purpose of considering the advisability of holding an exhibition in May, 1910, representative of the varied work carried out by municipalities. Among those present were:—Professor Henry Adams, President Association of Engineers in Charge; Mr. G. W. Chilvers, member of the Board of Examiners, Institute Sanitary Engineers; Mr. J. E. Edgcombe, Borough Electrical Engineer, Kingston-on-Thames; Mr. Leon Gaster; Mr. Arthur Harrison, Borough Engineer and Surveyor, Southwark; Mr. Alfred E. Penn, Chairman of Association of Engineers in Charge; Mr. E. Van Putten, Borough Engineer and Surveyor, Lewisham; Mr. E. F. Spurrell, Borough Surveyor, Holborn; Mr. H. T. Wakelam, County Engineer, Middlesex. Mr. F. W. Bridges, who convened the meeting, said that the "Municipal Exhibition of 1908" was a decided success, especially considering that it was the first of its kind, and it had established the fact beyond doubt that the Committee was perfectly correct in assuming that the responsibility of the municipal authorities as regards the well-being generally of the community warranted the holding of an exhibition entirely and exclusively devoted to such purposes. At the close of that exhibition the wish was expressed by surveyors, engineers, and others that another might be held in the course of a year or two, as the past exhibition, although most interesting and instructive, was not as representative as they wished it to be (partly because the objects and scope of the exhibition were not fully understood), and it was necessary that they should improve on the title so as to convey to the public what the municipal authorities were doing for them. It would serve the object of bringing to the notice of surveyors and engineers, and the other officials who were responsible for the well-being of the community, all the latest improvements, inventions, methods, and appliances so as to enable them to keep the administration of their respective departments thoroughly effective and up to date.—Capt. Riall Sankey moved:—"That this meeting heartily approved of and pledges its support to the second Municipal and Public Health Exhibition, to be held in London in May, 1910, believing that this will be of material assistance to those who are responsible for the administration of municipal affairs and of immense educational benefit to the community generally."—The motion was seconded by Professor Adams, supported by Mr. Edgcombe, and carried unanimously.—Professor Adams was elected President of the Advisory Council and Capt. Riall Sankey was appointed Vice-President.—Considerable discussion took place as to the title of the exhibition. It was felt that all municipal departments should be represented, and that the title, therefore, should be comprehensive. Eventually it was agreed to call it "The Municipal and Health Exhibition." It was decided that local committees and secretaries should be appointed as speedily as possible, and that the heads of local government authorities should be invited to give their patronage. All the arrangements will be carried out in conjunction with an Executive Committee, meeting in London. The offices of the exhibition are at Balfour House, Finsbury-pavement, London, E.C.

APPOINTMENT OF SANITARY OFFICERS.

The Local Government Board has sanctioned the appointment of T. A. Cartledge and E. C. Freeman as sanitary inspectors in the Metropolitan Borough of Bermondsey in place of J. Jones and H. O. Harris.

MASTER BUILDERS AND THE ISSUE OF QUANTITIES.

There has been a certain amount of trouble in South Africa during recent months on the point as to whether builders should be furnished with the quantities of material required as an assistance towards the tendering for contracts. In at least one instance the builders flatly refused to tender unless quantities were issued, and succeeded in beating down the opposition. On the surface of things it seems a little unreasonable of architects to expect builders to estimate without being given the help which is common in all British contracts. A reference was made to the subject by Mr. M. C. A. Meischke, of Johannesburg, President of the National Federation of Building Trade Employers of South Africa, while on a visit to Durban a week or two ago. After referring to the importance of organisation and combination, he strongly advised the Natal builders not to tender for work unless quantities were issued. He said that in the Transvaal quantities were supplied, and it was only fair and reasonable that they should be supplied. There were still some architects who sought to get prices without issuing quantities, but the Transvaal Association decided not to tender unless the quantities were supplied. If in Natal contractors were determined on the point he predicted success. It was his intention to visit East London and Bloemfontein in the interests of the Federation for the purpose of "livening things" up. He mentioned that it had been resolved to form an Association in Krugersdorp, and said the probabilities were that similar Associations would shortly be inaugurated in Germiston and Boksburg.—*South Africa.*

WHITGIFT HOSPITAL SCHEME.

A special meeting of the Croydon Town Council was held on the 22nd inst. to determine upon the expediency of promoting in Parliament next session a Bill to empower the Corporation to widen the easterly side of North-end, which would involve the demolition of the Hospital of Holy Trinity, founded by Archbishop Whitgift 300 years ago. Letters from the Woolwich Antiquarian Society, the Surrey Archæological Society, and the clergy of the rural deanery of Lambeth were read protesting against the destruction of this ancient landmark. The Council had previously decided, before proceeding with the Bill, to take the opinion of the burgesses on the scheme, which is estimated to cost 130,000*l.* Objection was taken to the scheme on financial grounds mostly. Twenty-five voted for the scheme and twenty-nine against it. A two-thirds majority of the whole Council was needed to carry the resolution.

Capital and Labour.

CONDITION OF EMPLOYMENT IN THE BUILDING TRADES.

Employment in October was slack. It showed some seasonal decline, but was rather better than a year ago. The percentage of trade union carpenters and joiners unemployed at the end of October was 11·2, as compared with 10·8 a month ago and 14·3 a year ago; and for plumbers, at the same dates, the percentages were 12·8, 13·3, and 12·8 respectively. These percentages were always exceeded in the Northern Counties and Scotland. Returns received from bricklayers', masons', plasterers', painters', and labourers' unions show a decline compared with a month ago. Slaters and tilers in Scotland and the North of England reported an improvement, and were fairly well employed. For London the trade union returns show that 14·2 per cent. of carpenters and joiners were unemployed at the end of October, as compared with 12·3 a month ago and 16·9 a year ago. The corresponding percentages for plumbers were 17·0, 13·2, and 17·0 respectively. Returns received from 701 firms employing 43,652 workpeople at the end of October show that there was a decrease of 5·4 per cent. in the total number employed by them as compared with a month ago, and a decrease of 1·2 per cent. as compared with a year ago. The decrease compared with a month ago was most marked in the London district. Compared with a year ago there were decreases in four districts, and increases in three districts.—*Board of Trade Labour Gazette.*

Law Report.

ACTION BY A BUILDER.

THE hearing was concluded, on the 23rd inst., in the Court of Appeal, before Lords Justices Vaughan Williams, Buckley, and Kennedy, of the case of Gray *v.* the Central London Properties Association, Ltd., upon the appeal of the defendants from a judgment of Mr. Justice Sutton in the King's Bench Division. (The case was reported in last week's issue of the *Builder*.)

The plaintiff, Mr. Charles Gray, a builder, carrying on business at Kensington, brought the action to recover from the defendants 12,500*l.* he alleged to be due from the defendants as an instalment on account of a contract to rebuild certain property in Hanover-square for 38,000*l.* It appeared that the contract was made through a Mr. Gilbert, and that the defendants were to advance the money as the building progressed. Mr. Gilbert became bankrupt, and as he had arranged mortgages on the property with the defendant company it was contended that the company were liable for the first payment of 12,500*l.*, which became due when the buildings reached a certain stage. On the other hand, it was said that the building lease and other securities were now the property of Mr. Gilbert's trustee in bankruptcy, and that the plaintiff was really only Mr. Gilbert's agent. Mr. Justice Sutton held that the plaintiff was entitled to the 12,500*l.*, for which sum he gave judgment, with interest at 5 per cent., and costs. Hence the present appeal of the defendants, which was expedited by an order of their lordships.

At the conclusion of lengthy arguments by counsel representing the respective parties, their lordships affirmed the decision of Mr. Justice Sutton, and dismissed the appeal with costs.

Mr. Rufus Isaacs, K.C., and Mr. Hastings appeared for the appellants; and Mr. Montague Lush, K.C., and Mr. Disturnal for the respondent.

Patents.

APPLICATIONS PUBLISHED.*

20,577 of 1908.—Jesse Herlin Tromanhauser: Concrete sea walls, docks, breakwaters, and like structures.

22,662 of 1908.—Thomas Edward Lake: A jointing cramp or soldering vice for joining nosepieces to pipes, or one pipe to another.

22,979 of 1909.—Spanners, Ltd., and William George Moore: Spanners and wrenches.

24,860 of 1908.—James Henry Smith: Decorators' adjustable liner for facilitating stencilling work for decorators and painters.

25,482 of 1908.—Henry Worthington Fielding: Apparatus for supplying the material to brickmaking and like machines.

25,635 of 1908.—Charles Percy Warham and Albert Edward Bulmer: Fastenings for window sashes and the like.

26,979 of 1908.—Harold James Arnold and Louis Andrew Benwell: Blind roller fittings.

27,035 of 1908.—Richard Mayer: Steam or hot-air apparatus in combination with a bath.

27,471 of 1908.—John Thomas Simpson: Reinforcing devices for concrete structures.

27,729 of 1908.—Frederick George Bazell and Robert Barnard Verney: Ceiling roses and the like for use in electric circuits.

2,337 of 1909.—Harry Graham Bell: Device for the prevention of rattling in doors and windows.

2,760 of 1909.—Mary Marshall: Ash screen or shield for use in connexion with domestic fireplaces.

5,138 of 1909.—William Oates and Frank Peto Barber: Multiple water-closet systems or installations.

7,413 of 1909.—Francis Edward Ward: Construction of ornamental glazing.

7,762 of 1909.—Samuel Holt Donnelly: Cleansing eye for water-closets and other appliances connected with drains and sewers.

12,051 of 1909.—Antonio Monti: Sliding windows.

12,126 of 1909.—Max Hartung: Manufacture of artificial stone slabs and the like.

13,446 of 1909.—Theodore Hobart Skinner and Oneida Community, Ltd.: Reinforcement for concrete sheathing for columns, beams, and other structures.

13,447 of 1909.—Theodore Hobart Skinner and Oneida Community, Ltd.: Reinforced concrete for building structures.

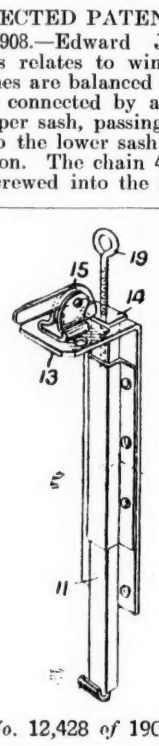
13,448 of 1909.—Theodore Hobart Skinner and Oneida Community, Ltd.: Reinforcement for concrete columns.

18,557 of 1909.—William Nelson Cavillier: Combined plumb-bob and chalk-line holder.

5,450 of 1909.—Arthur Smith West and George Frederick Chaplin: Service-pipe and like connexions for water mains.

SELECTED PATENTS.

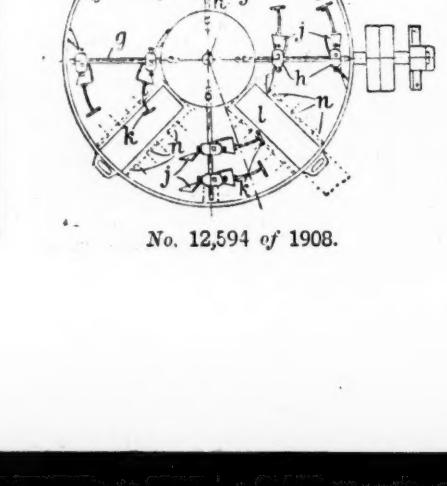
12,428 of 1908.—Edward James Reilly: Windows. This relates to windows in which the sliding sashes are balanced one against the other, and are connected by a chain or cord fixed to the upper sash, passing over a pulley, and attached to the lower sash by means of a sliding connexion. The chain 4 is attached to an eyelet 19 screwed into the slide 11, which



No. 12,428 *of* 1908.

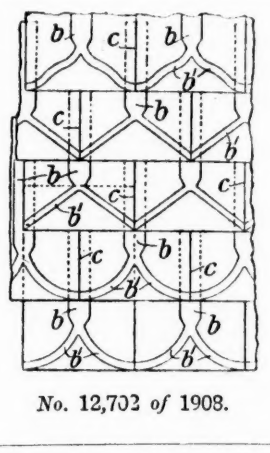
moves in a guide fixed to the side of the sash stile. The upward movement of the slide is limited by a stop-hook on the lower end of the slide, and is held in position by a catch 15, which is pivoted to a bracket fixed on the flange 13 of the guide-pieces, and engages the flanged top 14 of the slide. Stops on the frame limit the upward movement of the sashes.

12,594 of 1908.—Fred Wetherell Turner: Mixing concrete. This relates to a concrete mixer in which over the bottom of a pan *a* are provided plough-shaped stirrers *j*, which turn the materials over, and rakes *k*, which level the surface again. The stirrers and rakes are carried by sleeves *h* adjustable on horizontal arms *g* attached to a vertical shaft. The mixed materiai is discharged through an opening provided with a slide *l* working in grooves, the sides of the grooves being cut away at intervals as at *n* to allow of the escape of material lodging in the grooves.



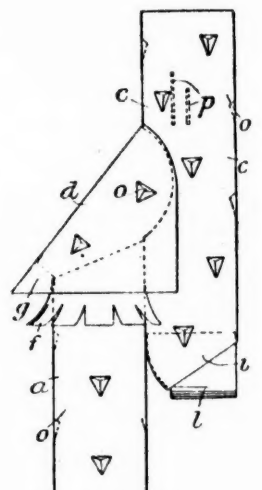
No. 12,594 *of* 1908.

12,702 of 1908.—William James Bourne: Roofing tiles. This relates to roofing tiles which are formed with a recess or well *b* in the middle of their upper surfaces, and with suitably-shaped channels b^1 communicating therewith and extending to or near to the bottom corners of the tile, so that when the tiles are arranged in place water passing through the meeting edges *c* of the tiles falls into the wells *b* in the tiles beneath, and is then conducted through the channels b^1 and wells *b* of successive tiles to the spouting.



No. 12,702 *of* 1908.

13,372 of 1908.—Friedrich Gierke: Chimney-tops. This relates to chimney-tops of the type in which an open-ended additional vertical pipe is arranged so that the smoke is delivered centrally into it from the main pipe, and consists in providing a cover *d* leaving an annular space *g* into which wind is directed by a curved serrated collar *f* provided above the main pipe *a*. The bottom of the additional pipe *c* is curved so as to have an inclined mouth *i* divided by a plate *l* curving in opposite directions at the bottom. Openings *o*, formed by cutting the metal and pressing it inwards beneath the incision, are formed in the walls of the top, and vertical plates *p* are placed within the additional pipe to prevent down-draught from passing to the main pipe.



No. 13,372 *of* 1908.

13,885 of 1908.—Société E. Ferrand et Pradeau: Floors and ceilings. This relates to a reinforced concrete floor, having integral reinforced concrete beams, which is cast about tubular blocks A, having straight undercut sides, and with or without the internal ribs. The blocks may be made of plaster or other

PATENTS.—*Continued on page 602.*

* All these applications are in the stage in which opposition to the grant of a patent upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments. xvii.; Auction Sales, xxii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

NOVEMBER 30.—**Kerne Bay.**—PAVILION ON PIER.—The Herne Bay U.D.C. invite designs for pavilion on pier. Two premiums are offered. For further particulars see advertisement in our issue of August 28.

NOVEMBER 30. — **Workington.** — SCHOOL. — The Cumberland Education Committee invite sketch plans, etc., for a Technical and Secondary School at Workington, Cumberland. For further particulars see advertisement in our issue of October 30.

DECEMBER 1.—**Bangor.**—LAYING-OUT A PARK.—The U.D.C. of Bangor (Co. Down) invite a scheme for the laying-out of a public park, 20 acres in extent, on ground acquired by them within their District. A premium of 30*l.*, to include all expenses, will be paid to the person whose scheme may be selected. Mr. J. Milliken, Town Clerk, Town Hall, Bangor, Co. Down.

DECEMBER 1. — **Tralee.** — PROPOSED CARNEGIE LIBRARY AND TECHNICAL SCHOOL.—The U.D.C. propose erecting this building, at a cost not exceeding 4,500*l.*, and invite competitive designs for same, according to "Instructions and Conditions," copies of which may be had by intending competitors on application to the Town Clerk, Tralee. Prizes of 20*l.* and 10*l.* to be awarded to the designs placed first and second by the assessor.

DECEMBER 3. — **Otley.**—SCHOOL.—The Governors of Prince Henry's Grammar School, Otley, have decided to erect new school buildings, and will be glad to hear from architects who are willing to submit designs and estimates. If the number of applications is excessive, it is intended by selection to invite twenty or twenty-five only to compete. A fully qualified non-competing architect, in conjunction with the West Riding Education Committee's Inspector of Secondary Schools, will assist the Governors in adjudicating upon the plans. Applications, stating qualifications and experience, must be received by Mr. Ernest S. Mead, Clerk to the Governors, East View, Otley, before December 3, 1909.

DECEMBER 3.—**Royal Leamington Spa.**—PUMP ROOM EXTENSION.—The Council offer a prize of 10*l.* for the best design for an extension to the cooling room at the Pump Room and Baths. Full particulars may be obtained on application to Mr. Leo. Rawlinson, Town Clerk.

* DECEMBER 17.—**London.**—DESIGN FOR A FAÇADE.—The proprietors of the *Builder* offer a first prize of 20 guineas and a second prize of 10 guineas for the two best designs for a suggested new façade to the Institute of Architects' House. See October 2 and 23: also advertisement in this issue for further particulars.

DECEMBER 18. — **Headingley, Leeds.** — TRAINING COLLEGE.—Leeds Education Committee invite architects practising in Leeds to submit competitive designs for proposed training college for teachers, Kirkstall Grange, Far Headingley, Leeds. Sir Aston Webb, C.B., R.A., F.R.I.B.A., has been appointed to assist and advise the Committee in deciding the competition. On the payment of a deposit of 2*l.* 2s. each competing architect may obtain a copy of the conditions of competition, etc. Mr. James Graham, Secretary for Education, Education Department, Leeds.

JANUARY 1. — **Hetton.** — CLUB.—The Committee of the Hetton Working Men's Club invite plans for the erection of a new club. Plans, with estimates, to be sent to Mr. Jas. Widdowfield, Secretary, Hetton Working Men's Club, Pemberton-street, Hetton-le-Hole.

JANUARY 1.—**Larne.**—TECHNICAL SCHOOL.—The Larne Technical Instruction Committee invite competitive designs for a technical school proposed to be erected in Victoria-street. A premium of 21*l.* will be paid for the approved design. Further particulars may be obtained from Mr. Thomas Clearkin, Secretary.

JANUARY 31. — **Cardiff.** — NATIONAL MUSEUM.—The Council invite competitive designs for the erection of a new National Museum at Cardiff. Premiums of 200*l.*, 150*l.*, and 100*l.* for second, third, and fourth places. Particulars on receipt of a deposit of 2*l.* 2s. from Dr. Wm. Evans Hoyle, Director of the Museums, City Hall, Cardiff. For further particulars see advertisement in our issue of August 28.

FEBRUARY 1. — **Oldham.** — PROPOSED EXTENSION OF THE TOWN HALL.—The T.C. invite competitive designs for a proposed extension of the existing Town Hall from architects practising or residing within the Borough. A plan of the site, together with instructions and suggestions for the guidance of architects, may be obtained on application to Mr. E. C. Foote, the Borough Surveyor, on payment of 1*l.* 1s. Premiums of 50*l.*, 30*l.*, and 20*l.* respectively will be awarded to the authors of the designs which are selected as first, second, and third in order of merit, and a sum of 5*l.* will be paid to all unsuccessful competitors who send in a complete set of plans in accordance with the instructions.

* MARCH 1.—GLAZED BRICKWORK.—A committee of glazed brick manufacturers invite designs for works to be executed in glazed brickwork, and also essays on same. Three prizes are offered. See advertisement in this issue for further particulars.

* NO DATE.—**Boston.**—CHURCH.—Designs are invited for a country church to seat 300. See advertisement in this issue for further particulars.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

NOVEMBER 29. — **Bailieborough.** — COTTAGES.—The R.D.C. invite tenders for the erection of single cottages throughout the district, in accordance with the plan, etc., prepared by Mr. Patrick O'Reilly, C.E., Bruise Hill, Virginia. Tender forms, etc., can be had on application to Mr. Hugh Clarke, Clerk of D.C., Poor Law Office, Bailieborough.

NOVEMBER 29. — **Castleford.** — SHOPWORK. — Shopfitters' work in connexion with new branch premises, situate in Vickers-street, Castleford, for Messrs. the Castleford Co-operative Industrial Society, Ltd. Bills of quantities, etc., may be obtained from Mr. J. Philip Padgett, architect and surveyor, Carlton-chambers, Castleford, on payment of 1*l.* 1s. deposit.

NOVEMBER 29.—**Merthyr Tydfil.**—SCHOOL ALTERATIONS.—Tenders are invited for alterations to Penyrheolgerig Infants' School. Applications for particulars to be made to the Education Committee's Architect, Deputy-Surveyor's office, Town Hall, Merthyr Tydfil.

NOVEMBER 29. — **Widnes.** — PAROCHIAL BUILDINGS.—Erection of new parochial buildings, Widnes. The drawings, etc., may be seen, and bill of quantities and form of tender obtained, at office of Mr. Frank S. Biram, architect, George-street, St. Helens.

NOVEMBER 30 —**Baildon.**—GOLF PAVILION.—Removal of wooden golf pavilion at Cobble Hall, Leeds, and its re-erection at Baildon. Specifications and particulars at the Golf House, Baildon. Mr. L. Thorpe, Secretary, Golf House, Baildon.

NOVEMBER 30.—**Bridgwater.**—OFFICES.—Alteration of new offices, Eastover, and erection of corrugated-iron store for the Bridgwater R.D.C. Plans, etc., may be seen at the office of the Council's Engineer and Surveyor, Binford-place.

NOVEMBER 30. — **Cavan.**—RENOVATIONS.—The Joint Committee of Management of Cavan Infirmary invite tenders for renovation of surgeon's residence (including painting, papering, and plastering of hall, rooms, etc., and other repairs). Specification may be inspected at the Infirmary.

NOVEMBER 30. — **Elland.** — HOUSE, SURGERY, ETC. — Erection of a house, surgery, garage, boundary walling, etc., in Victoria-road, Elland, for Dr. Morton. Plans, etc., may be seen, and quantities obtained, at offices of Mr. Ferd. F. Beaumont, architect, Southgate-chambers, Halifax.

NOVEMBER 30.—**Pencoed.**—COTTAGES.—Two cottages, stable, and coach-house, etc., for the Committee of Salem Chapel, Pencoed. Plans, etc., may be seen at the Court, Pencoed.

NOVEMBER 30. — **Pyle.** — HOUSES.—Erection of two houses at Pyle. Plans, etc., may be seen at office of Mr. J. A. James, architect, Port Talbot.

NOVEMBER 30.—**Queenstown.**—ALTERATIONS TO RESIDENCE.—Alterations to a gentleman's residence at Queenstown, in accordance with plans, etc., prepared by Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork.

NOVEMBER 30.—**Stonehaven.**—OFFICES.—Offices for the Stonehaven Auction Company, Ltd., Stonehaven. Plans, etc., may be seen with Mr. George Gregory, jun., architect, David-street, Stonehaven.

DECEMBER 1. — **Gilfach Fargoed.**—SCHOOLS.—The Glamorgan C.C. invite tenders for new Council school for girls at Gilfach Fargoed. Plans, etc., may be seen, and bills of quantities, etc., obtained, at the Bargoed Police-station, and at offices of Glamorgan C.C., Westgate-street, Cardiff.

DECEMBER 1. — **Glyncorwg.** — SCHOOL.—Glamorgan C.C. invite tenders for new mixed department at the Council school at Glyncorwg. Plans, etc., may be seen, and bills of quantities and form of tender obtained, at the Glyncorwg Police-station.

DECEMBER 1. — **Huddersfield.** — HOUSES. — Works (joiner's work excepted) required to be done in the erection of four dwelling-houses in Longwood-gate. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect and surveyor, 3, Market-place, Huddersfield.

DECEMBER 1.—**Kingstown.**—HOUSES.—The Kingstown U.D.C. invite tenders:—(1) For the construction of sixteen houses to be built at Paradise-row. The plans, etc., can be inspected at the Surveyor's Office, Town Hall; 1*l.* will be charged for each bill of quantities. (2) The Council invite tenders for the construction of additions to the caretaker's apartments at the Royal Victoria Baths. Plans, etc., can be examined in the Surveyor's Office. (3) The Council invite tenders for the construction of two shelters (Nos. 1 and 3) at the new park. Drawings, etc., can be examined in the Surveyor's Office.

DECEMBER 1. — **Leeds.** — LABOUR EXCHANGE. — The Commissioners of H.M. Works and Public Buildings invite tenders for the adaptation of Nos. 4, 6, and 8, Meadow-lane, Leeds, for a labour exchange. Drawings, etc., may be seen on application to the Assistant Architect, H.M. Office of Works, Leeds. Forms of tender may be obtained on application at H.M. Office of Works, etc., Storey's-gate, Westminster, S.W.

DECEMBER 1.—**Liverpool.**—LABOUR EXCHANGE.—The Commissioners of H.M. Works and Public Buildings invite tenders for the adaptation of premises in Fraser-street, Liverpool, for a labour exchange. Drawings, etc., may be seen on application to the Assistant Architect, H.M. Office of Works, Liverpool. Forms of tender may be obtained on application at H.M. Office of Works, etc., Storey's-gate, Westminster, S.W.

DECEMBER 1. — **Pontardulais.** — OFFICES. — The Glamorgan C.C. invite tenders for new offices, etc., at the Council school at Pontardulais. Specification and form of tender obtained for Work No. 5 at the Pontardulais Police-station.

DECEMBER 1. — **Port Talbot.** — SCHOOL. — The Glamorgan C.C. invite tenders for new boys' school, higher elementary school, and caretaker's house at Port Talbot. Plans, etc., may be seen, and bills of quantities, etc., obtained, at the Port Talbot Police-station.

* DECEMBER 1.—**S. Tottenham.**—ENLARGING SORTING OFFICE.—The Commissioners of H.M. Works invite tenders for enlargement of the S. Tottenham Sorting Office. See advertisement in this issue for further particulars.

DECEMBER 1.—**Swansea.**—LABOUR EXCHANGE.—The Commissioners of H.M. Works and Public Buildings invite tenders for the adaptation of No. 232, High-street, Swansea, for a Labour Exchange. Drawings, etc., may be seen on application to the Postmaster, Head Post-office, Swansea. Forms of tender may be obtained on application to the Secretary, H.M. Office of Works, etc., Storey's-gate, London, S.W.

DECEMBER 1.—**Warminster.**—ADDITIONS.—For additions to Sandhayes, Corsley, Warminster, for Mr. A. W. Parish. Drawings, etc., at the office of Mr. A. F. Long, architect, 53, Market-place, Warminster.

DECEMBER 4.—**Camphire.**—RESIDENCE.—Building a school teacher's residence at Camphire, Cappoquin, according to plans, etc., which can be seen at the residence of Rev. P. Dunphy, P.P., Cappoquin.

DECEMBER 4.—**Gosforth.**—STRONG ROOM.—Gosforth U.D.C. invite tenders for building strong room at the Council-chambers, High-street, Gosforth. All particulars may be obtained from Mr. George Nelson, A.M.Inst.C.E., Engineer and Surveyor to the Council, Council-chambers, High-street.

DECEMBER 4. — **Newburn.** — COTTAGES. — Newburn U.D.C. invite tenders for the erection of two cottages on Lemington-road, Newburn. Plans, etc., may be seen at the office of the Surveyor, Council Offices, Newburn.

DECEMBER 4.—**Pontycymmer.**—CHURCH.—Erection of new Welsh Church at Pontycymmer, Garw Valley. Plans, etc., may be seen at the offices of the architect, Mr. J. Cook Rees, architect, Neath.

DECEMBER 4.—**Selly Park.**—SCHOOL.—King's Norton and Northfield U.D.C. Education Committee invite tenders for new Council schools at Pershore-road, Selly Park. The schools to accommodate 1,250 scholars, in accordance with plans, etc., prepared by Mr. W. H. Ashford, Educational-chambers, 90, New-street, Birmingham. Names and addresses, together with a deposit fee of 1*l.* 1s., to Mr. John F. Moore, Secretary, Education Offices, King's Norton.

DECEMBER 4. — **Skipton.** — ADDITIONS. — Masons', joiners', plumbers', slaters', and iron works required to be done in the erection of additions to the dye-house at Belle Vue Mills, Skipton, for the English Sewing Cotton Company, Ltd. Plans may be seen, and bills of quantities obtained, on application at offices of Mr. James Hartley, architect, Skipton.

DECEMBER 6. — **Beckenham.** — REPAIRS, ETC. — The Beckenham Education Committee invite tenders for the annual repairs and decorations to the elementary schools in their district. Specifications, etc., obtained on application to Mr. John A. Angell, Surveyor, on the production of a receipt from the Collector for a deposit of 10*s.*

DECEMBER 6. — **Liverpool.** — ALTERATIONS.—The Commissioners of H. M. Works and Public Buildings invite tenders for alterations at the County Court Offices, Liverpool. Drawings, etc., may be seen on application to H.M. Office of Works, Victoria-street, Liverpool. Forms of tender may be obtained at H.M. Office of Works, etc., Storey's-gate, London, S.W.

* DECEMBER 7.—**Bromley.**—FIRE-STATION, ETC.—The Bromley B.C. invite tenders for a new fire-station

BUILDING—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

and a mortuary. See advertisement in this issue for further particulars.

DECEMBER 7.—**Jarrow.**—SCHOOL.—The C.C. of Durham invite sole tenders for the erection of a secondary school at Jarrow, in accordance with plans prepared by Mr. Fred. Rennoldson, architect, 37, King-street, South Shields, at whose office the plans, etc., may be seen. Bills of quantities may be obtained from Mr. J. A. L. Robson, Secretary for Higher Education, Shire Hall, Durham.

✱ DECEMBER 7.—**London.**—ALTERATIONS.—The Commissioners of H.M. Works and Public Buildings invite tenders for alterations and additions to Registry of Seamen, Royal Mint. See advertisement in this issue for further particulars.

DECEMBER 7.—**Margate.**—CONVERSION.—Conversion of existing stores at the King-street Depôt, Margate, into offices for the Inspector of Weights and Measures, in accordance with the plan, etc., prepared by the Borough Surveyor, which can be seen, and all particulars obtained, on application to Mr. E. A. Borg, Borough Surveyor, 13, Grosvenor-place, Margate.

DECEMBER 8.—**Ballymena.**—SCHOOLS.—The erection of proposed Guy's National Schools at Ballymena, Co. Antrim. Plans, etc., may be seen at office of Mr. James A. Hanna, C.E., architect, Ocean-buildings, Belfast, and forms of tender, etc., may be obtained from Messrs. W. H. Stephens & Sons, 13, Donegall-square North, Belfast, on payment of a deposit of 1*l.*

✱ DECEMBER 8.—**London.**—ADDITIONS.—The Metropolitan Asylums Board invite tenders for (1) erection of an enclosure to coach-houses at Eastern Ambulance Station, Homerton, N.E.; (2) additional lavatory accommodation for male staff at North Convalescent Fever Hospital, Winchmore Hill, N. See advertisement in this issue for further particulars.

DECEMBER 10.—**Fenit.**—CUSTOMS BUILDING.—The Board of Public Works, Ireland, invite tenders for erecting and completing a new Customs building at Fenit, Co. Kerry. The plans, etc., can be seen at the District Office of Public Works, Tralee. Forms of tender and bills of quantities will be supplied on deposit of 1*l.*

DECEMBER 10.—**Swinton, etc.**—SCHOOL WORKS.—The West Riding Education Committee invite whole or separate tenders for the following works:—Swinton Bridge Provided School (alterations and additions), Swinton, Kilnharst, Provided School (alterations and additions. Plans may be seen, and specifications, etc., obtained, on application to the West Riding Architect, County Hall Wakefield. A deposit of 1*l.* in each case must be sent by separate letter to the West Riding Treasurer, County Hall, Wakefield.

DECEMBER 11.—**Gowerton.**—ALTERATIONS.—The Standing Joint Committee of the Glamorgan Quarter Sessions and County Council invite tenders for alterations and additions to Gowerton Police-station. Plans can be seen, and copies of specifications, etc., obtained, at Gowerton Police-station, and at offices of the Clerk of the County Council, Glamorgan C.C. Offices, Westgate-street, Cardiff.

✱ DECEMBER 13.—**Battersea.**—ALTERATIONS.—The Metropolitan Water Board invite tenders for alterations and additions to existing buildings at their Battersea works. See advertisement in this issue for further particulars.

DECEMBER 13.—**Blackburn.**—POLICE-STATION AND SESSIONS COURT, ETC., BLAKEY MOOR (BASEMENT AND LOWER GROUND FLOOR SECTION).—The Corporation of Blackburn invite tenders for the erection of the new Police-station, Sessions Court, etc., on Blakey Moor. Forms of tender, etc., can be obtained from the joint architects, Messrs. Briggs, Wolstenholme, & Thornley, and Messrs. Stones & Stones, Richmond-terrace, Blackburn, on deposit of the sum of 1*l.* 1s. Names to the architects immediately.

✱ DECEMBER 13.—**London.**—BARRACKS.—The Secretary of State for War invites tenders for additional accommodation for non-commissioned officers and men, Wellington Barracks. See advertisement in this issue for further particulars.

DECEMBER 13.—**Pentyrch.**—REST.—Erection of proposed "Garth Rest" for Consumptives, Pentyrch, near Cardiff. Plans may be seen, and bills of quantities obtained, on payment of a deposit of 2*l.* 2s. Mr. John H. James, M.S.A., architect, Taff's Well, Cardiff.

DECEMBER 14.—**Northfleet.**—FIRE-STATION, HIGH-STREET.—The U.D.C. invite tenders for the erection of a fire-station. Full particulars, etc., may be seen at the offices of the District Surveyor, The Hill, Northfleet. The first eight applicants will be supplied with a copy of the specifications and drawings (uncoloured) on depositing with the Surveyor each the sum of 2*l.* 2s.

DECEMBER 18.—**Barmouth.**—ADDITIONS, ETC.—Alterations and additions to Caersalen C.M. Chapel, Barmouth. The plans, etc., can be seen with Mr. R. R. Williams, Ty'n Coed-buildings, Barmouth, and at the offices of Messrs. Owen Morris Roberts & Son, architects and surveyors, Portmadoc.

DECEMBER 20.—**Belmont.**—SCHOOLS.—Additions to the Ferguson Memorial Schools, Belmont, for the Committee of Belmont Presbyterian Church. Plans, etc., may be had at office of Mr. Thomas Houston, architect, Kingscourt, Wellington-place, Belfast.

DECEMBER 23.—**Birkenhead.**—CARBURETTED WATER-GAS BUILDINGS.—The Corporation invite tenders for the construction and erection of a block of buildings for the carburetted water-gas plant at the Gas Works, Thomas-street, Birkenhead. Copies of the specification, etc., may be obtained by approved applicants at the office of the Gas Engineer, Mr. T. O. Paterson, M.Inst.C.E., Gas Works, Thomas-street, Birkenhead, on making a deposit of 3*l.* 3s. The drawings may be inspected, and further information obtained, at the office of the Gas Engineer.

DECEMBER 24.—**Wandsworth.**—ROOFS.—The Guardians of the Wandsworth Union invite tenders for overhauling the roofs at the Infirmary, St. John's-hill, Wandsworth, S.W. Form of specification, etc., can be obtained upon application at office of Mr. F. W. Piper, Clerk, Union Offices, St. John's-hill, Wandsworth, S.W.

NO DATE.—**Cork.**—SHOPS, ETC.—Tenders are invited for the erection of shops and cycle factory at 5, King-street for Mr. W. H. Mulligan. Mr. Hugh W. Flanagin, B.E., B.A., architect, 2, South Mall, Cork.

NO DATE.—**Leeds.**—HOUSES.—Tenders for two houses, York-road. Bricklayers' labour only, slating, plumbing, plastering, painting. For particulars apply Mr. E. Hill, architect, 13, Oxford-row, Leeds.

NO DATE.—**Liverpool.**—VENTILATING STATION.—Tender forms, etc., of work and full buildings of the ventilating station and filling in of certain airways, situated at George's Dock, in the City of Liverpool. Tenders, forms, etc., can be obtained from Mr. J. Shaw, M.Inst.C.E., General Manager and Secretary (Mersey Railway), Central Station, Birkenhead.

NO DATE.—**Shotley Bridge.**—ALTERATIONS, ETC.—Alterations and additions to the King's Head Inn, Shotley Bridge. Names to Mr. D. M. Spence, architect and surveyor, Shotley Bridge.

NO DATE.—**South Brent.**—REPAIRS.—Repairs to Moorside, South Brent. House may be viewed by appointment with Mr. W. H. Soper, Clifton-place, Brent.

ENGINEERING, IRON, AND STEEL.

DECEMBER 3.—**Heybridge.**—BRIDGE.—The Essex C.C. invite tenders for taking down and rebuilding Wave Bridge, over the Chelmer and Blackwater Navigation, at Heybridge, near Maldon. Plans, etc., can be seen, and specification, etc., obtained, at the County Surveyor's office, Tindal-square, Chelmsford.

DECEMBER 3.—**Wrenthorpe.**—HEATING.—Stanley District Education Committee invite tenders for building of heating chamber, and installation of hot-water heating system at Wrenthorpe School, near Wakefield. Specifications may be obtained from Mr. Alexander Angus, 128, Northgate, Wakefield.

DECEMBER 4.—**Banchory.**—BRIDGE WORKS.—Works to be executed in taking down iron central span of bridge over Dee at Banchory, Kincardineshire, and replacing same with two steel bowstring girders, for Joint Committee of Kincardineshire Road Board and Banchory T.C. Drawings may be seen with Messrs. Jenkins & Marr, C.E., 16, Bridge-street, Aberdeen, who will supply specifications, etc.

DECEMBER 6.—**Edinburgh.**—STEEL GIRDER BRIDGE AT GORGIE MARKETS.—Edinburgh Corporation invite tenders for steel work, concrete, brick, paving, mason work, etc., in the superstructure and roadway of new bridge carrying the cross road over proposed railway access to the City Markets, etc., at Gorgie. Schedules, etc., may be obtained on application to the City Road Surveyor, City Chambers.

DECEMBER 7.—**London.**—BRIDGEWORK.—The Board of Directors of the Madras and Southern Mahratta Railway Company, Ltd., invite tenders for bridgework, as per the specification which may be seen at the offices of the company. The charge for the specification is 1*l.* 1s., which will not be returned. Mr. H. Bonham-Carter, Secretary, 91, York-street, Westminster, S.W.

DECEMBER 8.—**London.**—BRIDGES.—East Indian Railway Company invite tenders for the supply and delivery of thirteen 150-ft. spans for Kiul and Hullohur Bridges, as per specification to be seen at the company's offices. For each specification a fee of 1*l.* 1s. is charged, which cannot, under any circumstances, be returned. Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C.

NO DATE.—**Netherton.**—HEATING.—Estimates invited for heating Netherton Church, Maryport. Full particulars of system, with costs, to be sent to Curate, Ghyll Glen, Maryport.

MISCELLANEOUS.

NOVEMBER 29.—**Bailieborough.**—PIERS, ETC.—The R.D.C. invite tenders for the erection of piers and the hanging of gates on allotments in the Townland of Rosehill, in the Mullagh E.D. Specification can be seen at office of Mr. Hugh Clarke, Clerk of D.C., Poor Law Office, Bailieborough.

NOVEMBER 29.—**Barton.**—SCAVENGING.—The Barton-upon-Humber U.D.C. invite tenders for the scavenging of District No. 2. A plan of the district and form of specification may be seen at the office of the Inspector, Mr. D. Houghton.

NOVEMBER 30.—**Bristol.**—SCHOOL FURNITURE.—Bristol Education Committee invite tenders for school furniture required at Fairfield Secondary School. Specifications may be obtained at the offices, Guildhall, Broad-street.

DECEMBER 1.—**Oldham.**—WASHDOWN CLOSETS, ETC.—The Sanitary and Buildings Committee invite tenders for the supply and delivery at their Rhodes Bank Depôt, Mumps Station (Lancashire and Yorkshire Railway), of No. 200 washdown water-closets, cisterns, and fittings. Specification, etc., may be obtained at the office of the Borough Surveyor.

DECEMBER 1.—**Ystalyfera.**—FENCING, ETC.—Glamorgan C.C. invite tenders for fencing and levelling playing field at the County School at Ystalyfera. Plans may be seen, and specification, etc., obtained, at the Ystalyfera Police-station.

DECEMBER 2.—**Barrow-in-Furness.**—EQUIPMENT OF PLUMBING LABORATORY.—The Corporation invite tenders for the provision of apparatus, etc., required in the equipment of the plumbing laboratory. List and full particulars may be obtained on application to the Director of Education, Town Hall.

DECEMBER 2.—**Great Yarmouth.**—PULLING DOWN.—The Free Library Committee of the T.C. invite tenders for the pulling down and removing the materials in two cottages, St. George's Paved-row West. Mr. J. Wm. Cockrill, Borough Surveyor, Town Hall, Great Yarmouth.

DECEMBER 4.—**Ruislip-Northwood.**—SCAVENGING.—The U.D.C. invite tenders for the removal of house refuse. Forms of tender and full particulars may be obtained from Mr. W. Louis Carr, the Council's Surveyor.

DECEMBER 4.—**Thirsk.**—REMOVAL OF HOUSE REFUSE, CLEANSING OF EARTH CLOSETS, PRIVIES, AND ASHPITS.—Thirsk R.D.C. invite tenders for removal of house refuse and cleansing of earth closets, privies, and ashpits in the contributory places of Thirsk and Sowerby. Further particulars may be had, and conditions of the contract seen, on application at office of Mr. William Swarbreck, Clerk, Council Offices, Finkle-street, Thirsk.

DECEMBER 7.—**Watford.**—BLACKSMITHS' WORK.—The Watford U.D.C. invite tenders for blacksmiths' work. Form of tender, etc., on application to Mr. D. Waterhouse, Engineer, Council Offices, Watford.

DECEMBER 8.—**Burnham.**—STEAM ROLLING.—Burnham U.D.C. invite tenders for (1) steam rolling and scarifying for the ensuing twelve months; (2) 900 tons (more or less) of broken stone and gravel. Particulars, etc., may be obtained on application to Mr. Wm. H. Chowins, Surveyor, Public Offices.

DECEMBER 8.—**Poplar.**—ELECTRIC FAN, ETC.—The Guardians invite tenders for the supply of an electric fan and fittings in the laundry at the Workhouse, High-street, Poplar. Printed forms of tender may be obtained by personal application at office of Mr. G. Herbert Lough, Clerk to the Guardians, Guardians' Offices, 45, Upper North-street, Poplar.

✱ DECEMBER 9.—**Blackpool.**—TILING.—The Commissioners of H.M. Works and Public Buildings invite tenders for supplying and fixing of tile and faience dados at Blackpool new Post-office. See advertisement in this issue for further particulars.

DECEMBER 10.—**Worcester.**—HAULING OF MATERIALS.—The Corporation invite tenders for the hire of horses, carts, and drivers, for hauling materials, and for any other purpose. Forms of tender may be obtained at the office of Mr. T. Caink, A.M.Inst.C.E., City Engineer, Guildhall, Worcester.

✱ DECEMBER 14.—**Willesden.**—MOTOR FIRE-ENGINE.—The Willesden D.C. invite tenders for supply of a motor fire-engine. See advertisement in this issue for further particulars.

JANUARY 5.—**Melbourne, Australia.**—FEED-WATER OIL ELIMINATOR.—Copies of specification and drawing can be obtained on application to Messrs. McIlwraith McEacharn & Co., Ppty., Ltd., Billiter-square-buildings, London, E.C., agents for the Melbourne City Council. Applications must be accompanied by a deposit of 5s.

NO DATE.—**Chesterfield.**—RIFLE RANGE.—Making 30 yds. rifle range at Chesterfield. Full particulars, etc., on application to Mr. J. Marsden Chandler, surveyor, Bank-chambers, Stephenson-place, Chesterfield.

NO DATE.—**London.**—LOCOMOTIVES.—The Minister of Public Works, Bangkok, Siam, is inviting tenders for five tank locomotives (one-mètre gauge) for the Royal Siamese State Railways (Southern Line); also for 125 steel ballast wagons and five rail wagons (one-mètre gauge). Copies of specifications may be obtained at the price of 7s. 6d. each copy from the Siamese Legation, 23, Ashburn-place, London, S.W.

PAINTING, etc.

NOVEMBER 29.—**Harrogate.**—PAINTING.—The Harrogate Corporation invite tenders for painting the street lampposts, lanterns, etc., within the Borough. The specification may be seen, and form of tender obtained from Mr. F. Bagshaw, Borough Engineer and Surveyor.

NOVEMBER 30.—**Carnarvon.**—PAINTING, ETC.—Tenders wanted for painting and colouring the Carnarvon County School buildings and asphalting the grounds. Plans, etc., may be seen in the office of Mr. Rowland Lloyd Jones, M.S.A., 14, Market-street, Carnarvon.

NOVEMBER 30.—**Cavan.**—PAINTING, ETC.—The Joint Committee of Management of Cavan Infirmary invite tenders for renovation of surgeon's residence (including painting, papering, and plastering of hall, rooms, etc., and other repairs), in accordance with the architect's specification, which may be inspected at the infirmary.

DECEMBER 2.—**Dewsbury.**—CLEANING, ETC.—The Guardians invite tenders for cleaning and painting work, etc., at the Workhouse. Specifications can be seen, and particulars obtained, on application to the Master of the Workhouse.

DECEMBER 6.—**Sunderland.**—PAINTING.—The Council of the County Borough of Sunderland invite tenders for the inside painting, etc., of schools. Specifications may be seen, and schedule, etc., obtained, at the Borough Surveyor's office, Town Hall.

✱ DECEMBER 8.—**London.**—PAINTING.—The Metropolitan Asylums Board invite tenders for cleaning and painting works and repairs at Blackwall and Rotherhithe. See advertisement in this issue for further particulars.

DECEMBER 8.—**Sheffield.**—PLUMBERS', ETC., WORK.—The Education Committee invite tenders for plumbers and glaziers' work required for general repairs during the year 1910. Specifications, etc., may be had on application at the office of the Education Committee, Leopold-street.

NO DATE.—**Westmorland.**—CLEANING AND PAINTING.—Cleaning and painting of Westmorland Council schools. For particulars send stamped addressed foolscap envelope to the Secretary, Education Offices, Northumberland-road, Newcastle-upon-Tyne.

ROADS, SANITARY, AND WATER WORKS.

NOVEMBER 29.—**Harrogate.**—STREET WORKS.—The Harrogate Corporation invite tenders for private street improvement works required in King Edward's-drive—portion extending from Skipton-road, to No. 49. The plan and specification may be seen, and quantities obtained, from Mr. F. Bagshaw, Borough Engineer and Surveyor.

NOVEMBER 29.—**Prestwich.**—SEWERING.—The U.D.C. of Prestwich invite tenders for the sewering of Merton-road. Conditions can be inspected at the surveyor's office, Chester Bank, Prestwich, any morning between the hours of 9 a.m. and 11 a.m. The plans, etc., will be open for inspection at the office of the surveyor, Chester Bank. Copies of the bills of quantities, etc., can be obtained from the surveyor.

ROADS, etc.—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

NOVEMBER 29.—**Swinton.**—PAVING.—The Swinton and Pendlebury U.D.C. invite tenders for the paving, etc., of passages off Ringlow Park-road. Specification, etc., can be obtained on application to Mr. Henry Entwisle, Surveyor of the Council, Council Offices, Swinton.

NOVEMBER 30. — **Salford.** — PAVING. — Paving and completing certain streets. The plans may be seen, and forms of tender, etc., obtained, at the Borough Engineer's office, Town Hall, Salford.

NOVEMBER 30. — **Wokingham.** — EXTENSION OF WATER MAINS.—The R.D.C. invite tenders for 1,417 lin. yds. of 4-in. cast-iron water main, etc., in Hyde End-lane, Shinfield. Plans may be seen, and specifications, etc., obtained, at office of Mr. John F. Sargeant, Clerk, Council Offices, 8, Shute-end, Wokingham, on payment of 1*l.*

DECEMBER 1.—**Dartford.**—PAVING.—Paving in Bullace-lane, for the U.D.C. Plan, etc., may be seen, and quantities obtained, at the office of the Surveyor, Council Offices, Dartford.

DECEMBER 1.—**Enfield.**—MAKING-UP.—The U.D.C. of Enfield invite tenders for making-up private streets in their district, viz.:—Laurence-road, Green-street, Enfield Highway; Bedford-road, Green-street, Enfield Highway. Plans, etc., can be seen, forms of tender, etc., obtained, on application to Mr. Richard Collins, the Council's Surveyor, Public Offices, Enfield, Middlesex.

DECEMBER 1.—**Heavitree.**—STREET WORKS.—Heavitree U.D.C. invite tenders for the work to be carried out in connexion with the widening and making-up of North-street, Heavitree. Plans, etc., can be seen, and bills of quantities obtained (on payment of 1*l.* 1s.), at the Council Offices, Church-street, Heavitree.

DECEMBER 3. — **Pontypool.** — WATER WORKS. — The Directors of the Pontypool Gas and Water Company invite tenders for the laying of about two miles of cast-iron socket pipes (chiefly 10 in. in diameter). The drawings, etc., may be inspected, and form of tender may be obtained, on payment of 2*l.* 2s., on application at the office of the company at Pontypool, or at the office of Messrs. T. & C. Hawkesley, civil engineers, Caxton House (West Block), Westminster, S.W.

DECEMBER 6. — **Johnstone.** — SEWAGE PURIFICATION WORKS.—The T.C. invite tenders for (1) the construction of a road of access; (2) the diversion of outfall sewer; and (3) purification works. Plans may be seen, and copies of the specification, etc., obtained, at the office of the engineer, Mr. M. Ratcliffe Barnett, M.Inst.C.E., 124, St. Vincent-street, Glasgow, on payment of 2*l.* 2s.

DECEMBER 6. — **Richmond (Surrey).** — PAVING.—The T.C. invite tenders for paving the carriageways of Sheen-road, George-street, part of Hill-street, Victoria-place, the Quadrant, and the Square with creosoted deal blocks. Drawings, etc., may be seen, and all particulars obtained, on application to Mr. J. H. Brierley, Borough Surveyor, Town Hall, Richmond, where also a form of tender, etc., may be obtained on payment of a deposit of 1*l.* 1s.

DECEMBER 6. — **Richmond (Surrey).** — SEWERS.—The T.C. invite tenders for the construction of new sewer and surface-water sewer, and kerbing, channelling, and paving works in Victoria-place. Drawings, etc., may be seen, and all particulars obtained, on application to Mr. J. H. Brierley, Borough Surveyor, Town Hall, Richmond, where also a form of tender, etc., may be obtained on the deposit of 1*l.* 1s.

* DECEMBER 6. — **Wandsworth, S.W.** — ROAD-MAKING.—The Wandsworth B.C. invite tenders for making-up and paving of new streets in Tooting and Putney. See advertisement in this issue for further particulars.

DECEMBER 6.—**Whitley and Monkseaton.**—STREET WORKS.—The U.D.C. invite tenders for laying out and constructing streets on the Monkseaton Estate. Plan, etc., may be seen, and bill of quantities, etc., obtained, on application at the office of Mr. A. J. Rousell, A.M.Inst.C.E., the Council's Surveyor, Council Offices, Whitley Bay.

DECEMBER 7. — **Dudley.** — PAVING, ETC.—Woetslade U.D.C. invite tenders for excavating, paving, etc., of the back street between Angerton-terrace and Comet-street, Dudley. Plans, etc., may be seen, and full particulars obtained, on application to Mr. John Dinsdale, M.Inst.Mun.E., Surveyor to the Council, Dudley, Northumberland.

DECEMBER 8.—**Hemsworth.**—SEWER AT GRIMETHORPE.—The R.D.C. invite tenders for the supplying and laying of about 739 yds. of earthenware pipe sewer at Grimethorpe, in the Township of Brierley, near Barnsley. A plan, etc., may be seen, and bills of quantities may be obtained, at the office of Mr. T. H. Richardson, surveyor, at Hemsworth.

DECEMBER 10.—**Dublin.**—HOUSE DRAINAGE AND LAND DRAINAGE.—The Dublin Joint Hospital Board invite tenders for the works in connexion with their new sanatorium buildings at Crooksling, Saggart, Co. Dublin. Plans, etc., may be inspected, and particulars obtained, from the Board's Architect, Mr. George T. Moore, M.Inst.C.E.I., Nos. 1 and 2, Foster-place.

DECEMBER 10.—**Dublin.**—WATER WORKS, ETC., NEW SANATORIUM FOR CONSUMPTIVES AT CROOKSLING.—The Dublin Joint Hospital Board invite tenders for the works at Crooksling, Saggart, Co. Dublin. Plans, etc., may be inspected, and full particulars obtained, from the Board's Architect, Mr. George T. Moore, M.Inst.C.E.I., Nos. 1 and 2, Foster-place.

DECEMBER 10.—**Maryport.**—WATER SUPPLY: NEW GRAVITATION MAINS, FILTERS, ETC.—The U.D.C. of Maryport invite tenders for the materials to be supplied and work to be executed in the laying, making, and construction of works of water supply. The drawings may be seen, and copies of the specification, etc., may be obtained, on application to the engineer, Mr. J. C. Boyd, A.M.Inst.C.E., 18, Bank-street, Carlisle, on the deposit of a cheque or bank note for 5*l.*

DECEMBER 10. — **Stretford.**—STREET WORKS.—Stretford U.D.C. invite tenders for work of street paving and completion in Trafford Park-road. The drawings, etc., may be seen, and form of tender, etc., obtained, on application to Mr. Ernest Worrall, the Council's Surveyor, on payment by cheque of 2*l.* 2s.

DECEMBER 10. — **Swansea.** — SERVICE RESERVOIRS, MORRISTON.—Swansea Corporation invite tenders for the construction of two circular reinforced concrete service reservoirs, each to contain 2,000,000 gallons, at Morriston. Drawings, etc., may be seen at the office of Mr. R. H. Wyrill, the Waterworks' Engineer, Guildhall, Swansea, from whom form of tender may be obtained on payment of 1*l.* 1s.

* DECEMBER 13.—**Leicester.**—DRAINAGE.—The Secretary of State for War invites tenders for redrainage of the Glen Park Barracks, Leicester. See advertisement in this issue for further particulars.

* DECEMBER 14.—**Beverley.**—DRAINAGE.—The Visiting Committee of the East Riding of Yorkshire County Lunatic Asylum, Beverley, Yorks, invite tenders for redrainage of above asylum. See advertisement in this issue for further particulars.

DECEMBER 14.—**Helmsley.**—REDRAINAGE OF WORKHOUSE.—Tenders are invited for a scheme of redrainage to the Workhouse premises at Helmsley. Plans, etc., may be seen, and bill of quantities obtained, at the offices of the engineer, Mr. J. Myers, Rye-gate, Helmsley.

DECEMBER 14. — **Lewisham.** — KERBING, ARTIFICIAL STONE PAVING, METALLING, AND CHANNELLING WORKS.—The Council invite tenders for kerbing, etc., the footpaths with artificial stone (in separate contracts) of Levendale-road, Catford. The plan, etc., may be seen, and forms of tender obtained, at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case, which will not be returned.

DECEMBER 16.—**Pretoria, Transvaal.**—SEWERAGE AND SURFACE DRAINAGE WORKS, STONEWARE PIPES.—Tenders are invited for approximately 70,000 yds. of ordinary and special made stoneware socketted drain pipes for use in the sewerage of Pretoria. Specification, etc., may be obtained, and drawings consulted, at the office of Messrs. Mosenthal, Sons, & Co., 72, Basinghall-street, London, upon deposit of 5*l.* 5s.

DECEMBER 20.—**Newport.**—WATER MAIN.—The Isle of Wight Hospital Board invite tenders for providing and laying about 250 yds. of 3-in. water main, with the necessary fittings, from the 7-in. main at Foster's-corner, Fairlee-road, Newport, to the Hospital site. A plan and specifications of the works may be seen at the office of the Board's Architect, Mr. S. R. Cocks, No. 5, St. Thomas-street, Ryde.

NO DATE.—**Clayton.**—SEWER.—Clayton West U.D.C. invite tenders for about 340 yds of 9-in. sewer, with the necessary man and lamp holes. Mr. Geo. White, A.M.Inst.C.E., Estate Office, Mexboro', near Rotherham.

STONES, MATERIAL, AND STORES.

NOVEMBER 29.—**Glasgow.**—STORES.—The Directors of G. & J. Burns, Ltd., invite tenders for the supply of stores. Printed forms of tender may be had on application at office of Mr. A. M. Kay, Secretary, 30, Jamaica-street, Glasgow.

NOVEMBER 29. — **London.** — STORES. — The Great Northern Railway Company Directors invite tenders for the supply of certain new and the purchase of old stores for twelve months. A list of the contracts, and separate forms of tender for each contract, may be obtained upon application to Mr. Weeks, the Stores Superintendent, Doncaster.

NOVEMBER 29.—**Waterloo-with-Seaforth.**—SEWER PIPES.—The U.D.C. of Waterloo-with-Seaforth invite tenders for twenty special cast-iron pipes and about 500 yds. of stoneware or fireclay pipes. Specifications, etc., may be obtained on application to Mr. F. Spencer Yates, A.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloo.

NOVEMBER 30.—**Belfast.**—STONE.—The Improvement Committee invite tenders for the supply and delivery of about 8,000 tons broken stone at the Belfast Sewage Outfall Works, Northern-road. Form of tender, etc., may be obtained at the office of the City Surveyor.

NOVEMBER 30.—**Londcn.**—STEEL MATERIAL.—Bombay, Baroda, and Central India Railway Directors invite tenders for the supply of steel material. Tenders must be made on forms, copies of which, with specification, can be obtained at offices of Mr. C. Crommelin, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 1*l.* 1s. each (which will not be returned).

DECEMBER 1. — **Manchester.** — MATERIALS. — The Cleansing Committee of the Manchester Corporation invite tenders for twelve months' supplies of castings. Specifications may be obtained from Mr. R. Williamson, Superintendent of the Cleansing Department, Town Hall, Manchester.

DECEMBER 1.—**Worcester.**—SUPPLY OF MATERIALS.—The Corporation invite tenders for the supply of materials. Forms of tender, etc., can be obtained from the City Engineer's office, Guildhall, Worcester.

DECEMBER 6.—**Aberaman.**—STORES.—The Directors of the Powell Duffryn Steam Coal Company, Ltd., invite tenders for the supply of stores, etc. Forms of tender, etc., can be obtained on application to the Stores Manager, Aberaman Offices, near Aberdare.

DECEMBER 6.—**South Hetton.**—COLLIERY STORES.—The South Hetton Coal Company, Ltd., invite tenders for next year's supply of iron, castings, wire rope, oils, and other colliery stores. Forms of tender, etc., may be obtained from Mr. J. R Lambert, South Hetton, near Sunderland.

DECEMBER 6. — **Sunderland.** — MATERIALS. — The R.D.C. of Sunderland invite tenders for works and materials in their district for one year. Forms of tender may be obtained on application to Mr. J. C. Wilson, Clerk to the Council, 17, John-street, Sunderland.

DECEMBER 6. — **Wombwell.** — ROAD MATERIALS.—Wombwell U.D.C. invite tenders for the supply of materials. Further particulars, etc., may be obtained from Mr. W. Quest, Surveyor to the Council.

DECEMBER 7. — **East Stonehouse.** — STORES.—East Stonehouse U.D.C. invite tenders for the supply and delivery of ordinary stock bricks, English Portland cement, tar, pitch, stoneware pipes and gullies, etc. Forms of tender, etc., may be obtained on application to Mr. C. H. Trounce, Surveyor, Town Hall, East Stonehouse, Devon.

DECEMBER 8.—**Burnham.**—KERB.—For (1) 1,700 lin. yds. of kerb, and (2) 1,150 super. yds. of artificial stone flags, for U.D.C. Particulars, etc., may be obtained of Mr. Wm. H. Chowings, Surveyor, Public Offices, Burnham, Somerset.

DECEMBER 13. — **Trindon Grange.** — STORES.—Tenders are invited for the supply of oils and grease, iron, steel, metal and brass castings, bricks, etc., for twelve months. Forms of tender, etc., may be obtained from the Storekeeper, Trindon Grange Colliery.

DECEMBER 15.—**Maidstone.**—BROKEN ROAD STONE AND TARRED MACADAM.—The Bridges and Roads Committee of the C.C. invite tenders for the supply of materials. Tenders are also invited for tarred macadam. Forms will be furnished upon application to the County Surveyor, Maidstone.

NO DATE.—**Broughton.**—DRAIN TILES.—Drain tiles and sanitary pipes for the Broughton Estate, delivered to Elslack Station, or by canal. Samples required. Mr. E. J. Dunn, Estate Office, Broughton, near Skipton.

NO DATE.—**Copmanthorpe.**—GRAVEL.—Tenders invited for 400 or 500 tons of gravel. To be delivered by rail at Copmanthorpe Station or by barge at Acaster Malbis. Small samples may be sent to Copmanthorpe Station. Address Mr. W. F. Wailes-Fairbairn, Askham Grange, York.

NO DATE. — **Glasgow.** — STORES.—William Barr & Sons, Ltd., invite tenders for the supply of stores for the year from January 1 to December 31, 1910. Form of tenders and all particulars can be obtained on application at the office of the company, 10, Bothwell-street, Glasgow.

Public Appointments.

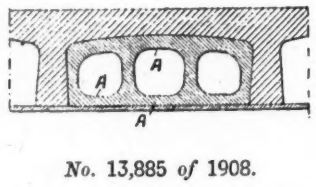
Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*INSTRUCTOR OF HANDICRAFT (WOODWORK)	London C.C.	See advertisement in this issue	Dec. 4
*CLERK OF WORKS	Middlesbrough Corporation..	Not stated	Dec. 8

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale
*BUILDING SITE, TOTTENHAM COURT-ROAD—At the Mart	Foster & Cranfield	Dec. 1
*MACHINERY AND BUILDER'S PLANT, WESTMINSTER, S.W.—On the Premises	H. J. Bromley	Dec. 2

PATENTS—*Continued from page* 598.

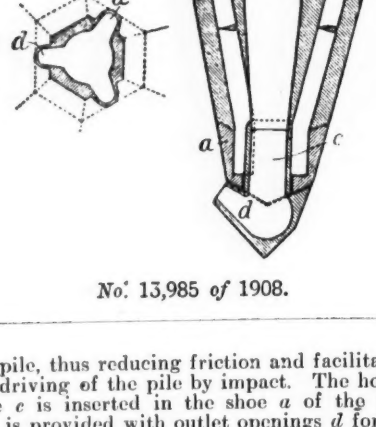
material, and may be reinforced with metal. They are supported by temporary centring,



No. 13,885 *of* 1908.

but remain permanently in the floor, and produce a flat ceiling which may be plastered.

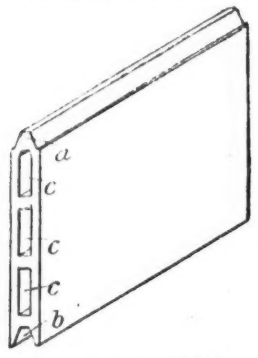
13,985 of 1908.—Eduard Züblin: Driving piles. This relates to piles in which, to prevent clogging of the water outlets at the point of a pile, the outlets are directed upwards, and their bottom edges project. The jets of water rinse the point and a considerable length of



No. 13,985 *of* 1908.

the pile, thus reducing friction and facilitating the driving of the pile by impact. The hollow core *c* is inserted in the shoe *a* of the pile, and is provided with outlet openings *d* for the water under pressure.

14,326 of 1908.—Amy Baker: Bricks or tiles. This relates to a baked clay or terra-cotta tile for ceilings and partitions formed with a



No. 14,326 *of* 1908.

tongue *a* and groove *b* on opposite edges, and with perforations *c*, which allow the insertion of mortar to key or tenon the tile to the adjacent tiles.

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

November 4.—By GILLART & SONS (at Llanidloes).

Llanguric Montgomery.—Steddfa-fach Farm, 528 a. 2 r. 37 p., f.	£580
Maesnant Farm, 1,149 a. 0 r. 23 p., f.	1,800
Llanidloes, Montgomery.—Penclun Farm, 230 a. 2 r. 26 p., f.	1,610

November 5.—By PEIRCE & THORPE (at West Haddon).

Winwick, Northants.—Pasture land, 178 acres, f.	4,500

November 8.—By G. F. BROWN & SON (at Sileby).

Sileby, Leicester.—Meadow land, 25 a. 1 r. 35 p., f.	1,370

November 9.—By ORCHARD & JOYCE (at Ashby-de-la-Zouch).

Ashby-de-la-Zouch, Leicester.—Pasture land, 31 a. 0 r. 25 p., f.	2,290
Measham, Leicester.—Pasture land, 37 a. 2 r. 34 p., f.	1,905

November 15.—By JONES, LANG, & CO.

Pimlico.—41 and 43, South Eaton-pl., u.t. 18¼ yrs., g.r. 8*l.*, y.r. 170*l.*	1,360
148, Ebury-st. (s), u.t. 13¼ yrs., g.r. 8*l.*, y.r. 115*l.*	920
By KNIGHT & CO.	
South Kensington.—6, Priory-gr., u.t. 22 yrs., g.r. 5*l.* 10s., p.	£400
Notting Hill.—St. James'-sq., The West London Tabernacle, u.t. 53 yrs., g.r. 52*l.* 10s.	2,150
November 16.—By ROBINS & HINE.	
Pinner.—Woodridings, Springfield, f., c.r. 60*l.*	575
By TYLER & CO. (at Alton).	
Wield, Hants.—The Wield Manor Estate, 1,048 a. 2 r. 20 p., f. (including timber)	14,757
November 17.—By CHAMBERS & CO.	
Brixton.—33 to 37, Thornton-st., u.t. 15½ yrs., g.r. 15*l.*, w.r. 191*l.* 6s.	670
Chelsea.—17, Slaidburn-st., u.t. 41¼ yrs., g.r. 4*l.* 10s., p.	130
By HENRY HOLMES & CO.	
Chiswick.—8, Riverview-gr., u.t. 93 yrs., g.r. 5*l.* 5s., c.r. 30*l.*	225
November 18.—By CANE & CO.	
Dulwich.—173, 175, and 177, Friern-rd., u.t. 70 yrs., g.r. 20*l.*, y.r. 98*l.*	735
By HOLIDAY & STANGER.	
Kennington.—3 and 5, Malmsey-pl., f., w.r. 30*l.*	315
Vauxhall.—31 and 33, Dawlish-st., f., w.r. 62*l.* 8s.	400
57 59, and 61, Dawlish-st., f., w.r. 92*l.* 6s.	735
22 to 27, Bradley-st., f., w.r. 118*l.*	920
By J. R. THORNTON.	
Ilford.—York-rd., f.g. rents 18*l.* 6s.	375
November 19.—By HENRY H. COLLIER & MADGE.	
Finchley.—Fortis Green-rd., l.g. rents 22*l.*, u.t. 58 yrs., g.r. 5*l.*	355
Finsbury Park.—Seven Sisters-rd., l.g.r. 14*l.*, u.t. 56 yrs., g.r. nil	260
Forest Hill.—Malham-rd., f.g.r. 12*l.*, reversion in 53 yrs.	220
Carshalton.—Stanley-rd., plot of land, f.	125

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for offices s. for shops; ct. for court.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.		
Best Stocks	1	7	0	per 1000 alongside, in river.	
Picked Stocks for Facings	2	10	0	"	delivered
Flettons	1	5	0	"	at railway depôt.
Best Fareham Red	3	12	0	"	" "
Best Red Pressed Ruabon Facing	5	0	0	"	" "
Best Blue Pressed Staffordshire	3	15	0	"	" "
Do. Bullnose	4	0	0	"	" "
Best Stourbridge Fire Bricks	3	14	0	"	" "
GLAZED BRICKS.					
Best White and Ivory Glazed Stretchers	10	17	6	"	" "
Headers	10	7	6	"	" "
Quoins, Bullnose, and Flats	14	7	6	"	" "
Double Stretchers	16	7	6	"	" "
Double Headers	13	7	6	"	" "
One Side and two Ends	17	7	6	"	" "
Two Sides and one End	18	7	6	"	" "
Splays and Squints	15	17	6	"	" "
Best Dipped Salt Glazed Stretchers	10	17	6	"	" "
Headers	10	7	6	"	" "
Quoins, Bullnose, and Flats	14	7	6	"	" "
Double Stretchers	16	7	6	"	" "
Double Headers	13	7	6	"	" "
One Side and two Ends	17	7	6	"	" "
Two Sides and one End	18	7	6	"	" "
Splays and Squints	15	17	6	"	" "
Second Quality White and Dipped Salt Glazed	1	5	0	"	less than best.

	s.	d.	
Thames and Pit Sand	6	6	per yard, delivered.
Thames Ballast	5	0	" "
Best Portland Cement	28	0	per ton, "
Best Ground Blue Lias Lime	19	0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	" "
White Paseled, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	" "

STONE (*continued*).

	s.	d.		
Ancaster in blocks	1	10	per ft. cube, deld. rly. dep.	
Beer "	1	6	" "	
Greenshill "	1	10	" "	
Darley Dale in blocks	2	4	" "	
Red Corsehill "	2	2	" "	
Closeburn Red Freestone	2	0	" "	
Red Mansfield "	2	4	" "	

YORK STONE—*Robin Hood Quality.*

	s.	d.		
Scapp'ed random blocks	2	10	per ft. cube, deld. rly. dep.	
6 in sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super.	"
6 in. rubbed two sides ditto. ditto	2	6	"	"
3 in. sawn two sides slabs (random sizes)	0	11½	"	"
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	"	"
1½ in. to 2 in. ditto. ditto	0	6	"	"
Scappled random blocks	3	0	per ft. cube.	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft super.	"
6 in. rubbed two sides ditto	3	0	"	"
3 in. sawn two sides slabs (raudom sizes)	1	2	"	"
2 in. self-faced random flags	0	5	"	"

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1300 of 1200 at r.d.
20×12 " "	13	17	6	" "
20×10 first quality "	13	0	0	" "
20×12 " "	13	15	0	" "
16×8 " "	7	5	0	" "
22×10 best blue Portmadoc	12	12	6	" "
16×8 " "	6	12	6	" "
20×10 best Eureka unfading green	15	17	6	" "
20×12 " "	18	7	6	" "
18×10 " "	13	5	0	" "
16×8 " "	10	5	0	" "
20×10 permanent green	11	12	6	" "
18×10 " "	9	12	6	" "
16×8 " "	6	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. dep.
Hip and Valley tiles	3	7	per doz. "
Best Broseley tiles	50	0	per 1000 "
Do. Ornamental tiles	52	6	" "
Hip and Valley tiles	4	0	per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 "
Do. Ornamental do.	60	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 "
Do. Ornamental do.	54	6	" "
Hip tiles	4	1	per doz. "
Valley tiles	3	8	" "
Best "Rosemary" brand plain tiles	48	0	per 1000 "
Best Ornamental tiles	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	8	" "
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 "
Do. pressed	47	6	" "
Do. Ornamental do.	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	6	" "
Staffordshire (Hanley) Reds or Brindled tiles	42	6	per 1000 "
Hand-made sand-faced	45	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	6	" "

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14	0	0	... 15	10	0
Deals: best 3 by 9	13	10	0	... 14	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	... 12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best.		
Battens: seconds	0	10	0	"		
2 in. by 4 in. and 2 in. by 6 in.	9	10	0	... 10	10	0
2 in. by 4½ in. and 2 in. by 5 in.	9	0	0	... 10	0	0
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5	0	0	... 5	10	0
Seconds	4	10	0	... 5	0	0
Small timber (8 in. to 10 in.)	3	17	6	... 4	0	0
Small timber (6 in. to 8 in.)	3	5	0	... 3	10	0
Swedish balks	2	12	6	... 3	0	0
Pitch-pine timber (30 ft. average)	4	10	0	... 5	5	0

JOINERS' WOOD.	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	10	0	... 25	10	0
3 in. by 9 in.	22	10	0	... 23	10	0
Battens 2½ in. and 3 in. by 7 in.	17	0	0	... 18	0	0
Second yellow deals, 3 in. by 11 in.	19	0	0	... 20	0	0
3 in. by 9 in.	18	0	0	... 19	10	0
Battens, 2½ in. and 3 in. by 7 in.	14	0	0	... 15	0	0
Third yellow deals, 3 in. by 11 in. and 9 in.	14	0	0	... 15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	... 12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	10	0	... 22	10	0
Do. 3 in. by 9 in.	18	10	0	... 19	10	0
Battens	14	0	0	... 15	0	0

WOOD (*continued*).

	At per standard. £ s. d.	£ s. d.
JOINERS' WOOD (*continued*)—		
Second yellow deals, 3 in. by 11 in.	16 10 0	... 17 10 0
Do. 3 in. by 9 in.	15 0 0	... 16 0 0
Battens	11 10 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	... 14 10 0
Do. 3 in. by 9 in.	13 0 0	... 14 0 0
Battens	10 10 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	15 0 0	... 16 0 0
" " 3 in. by 9 in.	14 0 0	... 14 10 0
Battens	11 10 0	... 12 10 0
Second white deals, 3 in. by 11 in.	14 0 0	... 15 0 0
" " 3 in. by 9 in.	13 0 0	... 14 0 0
Battens	10 10 0	... 11 0 0
Pitch-pine: deals	19 0 0	... 21 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	"
Seconds, regular sizes	33 0 0	"
Oddments	28 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak logs—		
Large, per ft. cube	0 3 0	... 0 3 9
Small " "	0 2 6	... 0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	... 0 0 9½
¼ in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 10	... 0 1 1
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak per load	18 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	... 0 16 6
¼ in. by 7 in. yellow matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. " "	0 14 0	... 0 18 0
¼ in. by 7 in. white " "	0 10 0	... 0 11 6
1 in. by 7 in. " "	0 12 9	... 0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	... 7 10 0
Compound Girders, ordinary sections	9 0 0	... 10 0 0
Steel Compound Stanchions	11 0 0	... 12 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	... 10 0 0
Flitch Plates	9 0 0	... 9 10 0
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	... 8 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	8 10 0	... 9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	... 9 5 0
Staffordshire "Marked Bars"	10 10 0	... —
Mild Steel Bars	8 15 0	... 9 5 0
Hoop Iron, basis price	9 5 0	... 9 10 0
" " Galvanised	17 0 0	... —
(*And upwards, according to size and gauge.)		
Sheet Iron, Black—		
Ordinary sizes to 20 g.	9 15 0	... —
" " 24 g.	10 15 0	... —
" " 26 g.	12 5 0	... —
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	... —
Ordinary sizes to 22 g. and 24 g.	15 10 0	... —
" " 26 g.	16 10 0	... —
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	18 0 0	... —
" " 22 g. and 24 g.	18 10 0	... —
" " 26 g.	20 0 0	... —
Galvanised Corrugated Sheets—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 10 0	... —
" " 22 g. and 24 g.	14 15 0	... —
" " 26 g.	16 5 0	... —
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12 0 0	... —
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	... —
" " " 26 g.	15 0 0	... —
Cut Nails, 3 in. to 6 in.	10 10 0	... 11 0 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	
LEAD—Sheet, English, 3lb. and up.	16 10 0	... —
Pipe in coils	17 0 0	... —
Soil pipe	20 0 0	... —
Compo pipe	20 0 0	... —
ZINC—Sheet—		
Vielle Montagne	27 15 0	... —
Silesian	27 10 0	... —
COPPER—		
Strong sheet per lb.	0 1 0	... —
Thin "	0 1 1	... —
Copper nails "	0 0 10	... —
Copper wire "	0 0 10	... —
BRASS—		
Strong Sheet "	0 0 11	... —
Thin "	0 1 0	... —
TIN—English Ingots "	0 1 4	... —
SOLDER—Plumbers' "	0 0 6½	... —
Tinmen's "	0 0 9	... —
Blowpipe "	0 0 11	... —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1½d. " "
21 oz. thirds	3d. " "
" fourths	2½d. " "
26 oz. thirds	4d. " "
" fourths	3d. " "
32 oz. thirds	4½d " "
" fourths	4½d. " "
Fluted Sheet, 15 oz	3½d. " "
" 21 oz.	4½d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d. per ft. delivered.
⅜ "	2½d. " "
½ "	2½d. " "
Figured, Oxford Rolled and Oceanic " Glass, white	3½d. " "
" " tinted	5d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 2 7
" " ,, in barrels	"	0 2 8
" " ,, in drums	"	0 2 11
Boiled ,, ,, in barrels	"	0 2 11
" " ,, in drums	"	0 3 2
Turpentine in barrels	"	0 3 5
" in drums	"	0 3 7
Genuine Ground English White Lead	per ton	20 0 0
Red Lead, Dry	"	19 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 10 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 18 0
White Pale Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursday*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted*. † Denotes *provisionally accepted*.**

BOWDON LODGE (Cheshire).—For heating and ventilation at Altrincham County High School for Girls, for the Altrincham Education Committee. Messrs. Sankey & Cubbon, Architects, 4, Chapel-walks, Manchester. Quantities by Mr. W. Windsor, 37, Brown-street, Manchester:—

Elliott, Ellis, & Co., 138, Princes-street, Manchester* £548 10

BOWDON LODGE (Cheshire).—For electric lighting and wiring of Altrincham County High School for Girls. Messrs. Sankey & Cubbon, architects, 4, Chapel-street, Manchester. Quantities by Mr. Wm. Windsor, 37, Brown-street, Manchester:—

J. Swainson & Co., 22, Booth-street, Manchester* £248 19

CAERLEON.—For erecting playsheds at Williams's Endowed Schools, for the Governors. Mr. H. J. Griggs, architect, Metropolitan Bank-chambers, Newport, Mon.:—

T. Jenkins	£556 0 0	E. C. Jordan & Son	£340 0 0
Williams & Son	506 0 0	G. Prosser	336 0 0
E. D. W. Evans	402 14 10	J. B. Jenkyn	334 0 0
R. H. Parkyn	381 0 0	F. C. Parfitt	330 0 0
Phillips, Clark, & Co.	375 0 0	G. F. Leadbeter	328 0 0
E. Richards	368 11 0	C. H. Reed	310 0 0
P. H. Saunders	350 5 0	E. Dean, Newport*	271 10 0
J. Charles	347 0 0		
J. H. Williams	344 0 0		

ESTON.—For new roadway in continuation of the new road called Grange-road, for the Urban District Council. Mr. C. McDermid, Surveyor, Council Offices, Grangetown, S.O., Yorks:—

Crombie & Son	£408 12 10	A. E. Hobbs	£366 9 4
J. B. Fowells & Sons	385 7 7	G. M. Radge	294 11 10
T. Dunn	383 3 2	W. Smith, Grangetown, S.O., Yorks	294 5 0
Goodall Bros.	380 19 1½		

HALE.—For making-up carriageways round Peel-causeway improvement, for the Urban District Council. Mr. S. A. Pickering, Surveyor. Quantities by Surveyor:—

Bradshaw & Co.	£397 3 6	W. H. Workington, Ltd., Manchester*	£212 13 6
Exors. T. Barber	295 5 6	J. Hamilton & Son	204 0 0
W. J. Woodfine	283 11 6	A. H. Macdonald	140 0 0
G. Bozson, jun.	259 0 0		

HANDSWORTH.—For repairs to Victoria Park House roof, for the Urban District Council of Handsworth:—

J. K. Littler	£295 12 6	Maddocks & Walford	£135 0 0
Walton Bros.	245 0 0	G. Waterman Jun.	184 10 0
G. Webb	219 0 0	P. W. Cox, Handsworth*	167 0 0
Smith Bros.	210 0 0	A. E. T. Hassall	165 0 0
E. Garfield, Ltd.	194 0 0		
Hulbert & Ladbury	193 13 0		
W. Bishop	187 0 0		

[Surveyor's estimate, £192 10s.]

HORWICH.—For new street works in the Beehive district, for the Urban District Council. Mr. T. Green, Surveyor:—

W. Kearns	£2,220 19 1	E. Yates, Horwich*	£1,802 15 3
W. J. Slater	1,979 5 6	J. Horrocks	1,785 3 8
W. Pollitt & Co.	1,923 18 0		

KINGSWOOD.—For 362 yds. of 9-in. sanitary pipe sewers, etc., on Holly Hill-road, and 165 yds. 9-in. pipes, manholes, etc., Pillinger's Field, for the Urban District Council. Mr. W. D. Bell, Surveyor, Kingswood. Quantities by Surveyor:—

E. Monks, Fishponds, Bristol (No. 1)	£249 0 0	Merryweather Bros.	£191 0 0
J. Byard & Son	216 0 0	T. Bennett	190 0 0
F. Martin	200 6 0	W. Marsh	159 0 0
Thatcher Bros.	200 0 0	E. F. Woodward	149 0 0
		H. Ayres, Kingswood, Bristol*	128 15 9

[Surveyor's estimate, £182.]

LLANDRYGARN.—For alterations and repairs to Council school. Mr. J. Owen, County Architect, Menai Bridge and Holyhead:—

O. Jones	£965 0	R. J. Jones	£878 0
J. & J. W. Owen, Llanllwn*	895 7	R. Thomas	850 0

LONDON.—For carrying out alterations at the police-station at Kennington-lane, S.E. Mr. J. Dixon Butler, F.R.I.B.A., Surveyor to the Metropolitan Police, New Scotland-yard, S.W. Quantities by Messrs. Thurgood, Son, & Chidgey, 8, Adelphi-terrace, Strand, W.C.:—

C. Ansell	£5,000	Holloway Bros., Ltd.	£4,550
Rice & Sons	4,949	Mowlem & Co., Ltd.	4,540
F. & H. Higgs	4,786	Holliday & Greenwood	4,545
Smith & Sons	4,718	Higgs & Hill, Ltd.	4,549
Lole & Co.	4,642	Patman & Fotheringham	4,433
F. G. Minter	4,618	W. J. Fryer & Co.	4,371
E. A. Roome & Co.	4,623		
W. Eyre	4,595		
Lathey Bros.	4,575		

LONDON.—For making-up the roadway of the extension of Oxford-gardens, situate in the borough of Kensington, for the Royal Borough. Mr. A. R. Finch, A.M.I.C.E., Borough Engineer and Surveyor, Kensington Town Hall, W.:—

W. Shepherd & Sons	£1,532 7 4
G. Wimpey & Co.	1,385 0 0
J. Mears	1,350 0 0
E. Rogers & Co.	1,323 0 0
W. Griffiths & Co., Ltd.	1,299 0 0
J. Mowlem & Co., Ltd.	1,229 0 0
E. T. Daley & Son	1,151 10 0
J. Latter, Wood-lane, Shepherd's Bush†	1,123 2 4

LONDON.—For alterations and repairs, 9, Well-walk, Hampstead, N.W., for Mr. H. G. Rooth. Messrs. Potter, surveyors, 28, Rosslyn-hill, Hampstead:—

Pitman & Son	£339 0	Roff & Son	£249 0
B. Colley & Son	275 0	C. B. King, Ltd.*	247 0
G. Kentish	249 15		

LONDON.—For putting in a suitable shop-front, No. 58, Strand, for the London County Council:—

F. Sage & Co.	£107 0	C. Spreckley & Co., Phœnix-place, W.C.*	£95 0
E. Pollard & Co.	105 0		
Sims & Wood	104 10		

LONDON.—For electrical equipment, etc., in connexion with the extension of the London County Council Paddington Technical Institute, for the London County Council:—

Strode & Co.	£367 0	Deane & Beal, Ltd., 1, Arthur-street East, London Bridge, S.E.*	£287 10
J. & F. May	348 10		
G. & E. Bradley	309 10		

LONDON.—For the undermentioned sewers, for the London County Council:—

J. Mowlem & Co., Ltd., under the jobbing schedule of prices—Ratcliff-highway sewer, at Cleveland-street, £450; and the City-road branch of the London Bridge sewer, £450.

LONDON.—For enlargement in Old Oak, Commonlane, Stamford-brook sewer, for the London County Council:—

J. Mowlem & Co., Ltd., to carry out the work for the sum of £1 14s. for each lineal foot (the approximate total cost on this basis being £850).

MIDDLESBROUGH.—For erecting the Kirby secondary school, for the Education Committee. Mr. A. Forrester, architect, 141, High Albert-road, Middlesbrough. Quantities by the architect:—

W. A. King & Son, Ltd., North Ormesby, Middlesbrough*	£7,550 0 0
Heating Installation.	
Blakeborough & Rhodes, Stockton-on-Tees	£227 0 0
Electric Lighting.	
Graham Bros., Middlesbrough	£172 11 0

MISKIN.—For erecting a higher standard mixed school for 160 scholars, with laboratory, etc., for Mountain Ash Education Committee. Mr. W. H. Williams, Architect, Town Hall, Mountain Ash. Quantities by Architect:—

J. H. Maggs & Co.	£5,169 12 0	D. Davies & Sons	£4,370 0 0
T. F. Howells	4,908 6 6	T. W Davies	4,300 0 0
A. R. John	4,583 3 4	Jones Bros., Edwardsville,	
Knox & Wells	4,545 0 0	S. Shail	4,508 0 0	Treharris,
W. H. Evans	4,430 15 8	R.S.O.*	4,260 0 0

NARBOROUGH.—For Forest-lane sewers, for the Blaby Rural District Council. Mr. J. Turner, Engineer, South Wigston:—

H. Law	£848 0 0	H. A. Dix & Co.	£695 3 8
O. Wright & Co.	834 18 3	H. E. Palmer	689 2 0
J. B. Wickstead & Co.	737 4 2	W. W. Webster	689 0 0
J. Hutchinson & Son	725 0 0	H. E. Buckley, Bradford*	679 13 9
C. Southam & Son	699 0 0	Stimpson & Rollston	679 0 0
		A. M. Macdonald	595 0 0

NEWBURY.—For erecting ten cottages, for the Town Council. Mr. S. J. L. Vincent, Borough Surveyor, Newbury:—

G. Whiting	£1,961	Hedges Bros.	£1,578
A. T. Chivers	1,870	T. E. Townsend	1,550
Hoskings Bros.	1,851	Houghton & Hitchman	1,549
Edwards	1,806	G. Elms	1,515
Plumb	1,783	S. Bastin‡	1,495
H. Elms	1,700		
A. M. Hedge	1,618		

‡ Recommended for acceptance.

NORTHWOOD.—For making-up of Carew-road, for Ruislip-Northwood Urban District Council. Mr. W. Louis Carr, Surveyor, Council Offices, Northwood, Middlesex:—

D. R. Paterson, Ltd.	£2,389 9 0	A. B. Champniss	£1,619 7 6
J. Young	1,950 14 7	A. Wooster	1,594 14 10
T. Free & Sons	1,777 6 6	T. Watson, Jun.	1,557 0 0
T. Adams	1,711 3 9	Clements, Knowling, & Co., Brentford*	1,547 0 0
G. R. Mann	1,700 0 0		
Langley & Johnson	1,698 19 6		
R. W. Swaker	1,692 6 11		
J. C. Trueman, Ltd.	1,645 0 0		

PENSARN.—For alterations and repairs to Council school. Mr. J. Owen, County Architect, Menai Bridge and Holyhead:—

J. Owen & W. Williams	£1,918 0	R. Thomas	£1,478 0
O. Jones	1,885 0	O. Thomas, Amlwch*	1,450 0
J. & J. W. Owen	1,818 9		

RHOSESMOR (Holywell).—For a new chapel and schoolroom, etc., at the Rhosesmor Welsh C.M. Church. Messrs. R. Owen & Son, architects, Westminster-chambers, Crosshall-street, Liverpool:—

J. Hayes	£3,490 0 0	R. Jones & Sons	£2,100 0 0
Gibeon Bros.	3,333 0 0	M. S. Rogers, Flint*	1,770 0 0
A. B. Lloyd	2,700 0 0		
R. Williams	2,371 9 3		

RICHMOND (Surrey).—For the construction of filter-beds, main-laying, etc., for the Borough Council. Messrs. J. Quick & Son, engineers, 14, Victoria-street, Westminster, S.W.:—

Monro & Co., London* £3,592

RICHMOND (Surrey).—For the supply of cast-iron pipes, for the Borough Council. Messrs. J. Quick & Son, engineers, 14, Victoria-street, Westminster, S.W.:—

Stanton Iron Works Co., Ltd., near Nottingham—schedule of prices.

STANLEY.—For erecting new Council offices in Front-street, for the Urban District Council. Mr. J. W. Wilson, architect, 3, Coleshill-street, Sutton Coldfield, Warwickshire:—

J. Jennings	£4,819 19 3	B. Bolam	£4,301 2 7
Dyson Bros.	4,636 14 8	W. Hall	4,277 19 0
W. Weatherly	4,606 0 0	Reynoldson & Son	3,838 0 0
A. R. Davis	4,522 2 0	Dallon & Long	3,750 0 0
L. Jobling	4,493 8 4	Southern	3,720 0 0
E. T. George	4,480 0 0	T. H. Worley, Tantobie*	3,489 14 4
I. Bewley	4,449 0 0		
J. W. White	4,420 0 0		

STAPLEFORD.—For pork shop, foreign meat shop, etc., Nottingham-road, Stapleford. Mr. Walter H. Woods, architect, land and quantity surveyor, High-street, Long Eaton, near Nottingham. Quantities by the architect:—

J. Moult	£405	Perks & Son, Ltd.	£360
F. Martin, Bailey-street, Stapleford*	369	R. J. Warren	350

STIFFORD.—For tarring playgrounds at Stifford schools, for the Essex Education Committee. Mr. Christopher M. Shiner, A.R.I.B.A., architect, 10, John-street, Adelphi, W.C., and Gate House, Grays:—

G. Brown	£92 10	Brown Bros.	£67 12
R. W. Mead	90 0		

STIFFORD.—For tarpaving playgrounds at Stifford schools, for the Essex Education Committee. Mr. Christopher M. Shiner, A.R.I.B.A., architect, 10, John-street, Adelphi, W.C., and Gate House, Grays, Essex:—

R. W. Mead	£290 0	Hobman & Co.	£263 0
Smart & Co.	274 0	Constable & Co.	262 10

SWANAGE.—For enlarging the county school, for Dorset Education Committee. Mr. W. J. Fletcher, architect, Wimborne:—

Building.

H. & J. Hardy, Swanage £1,680

Heating.

Crispin & Sons, Bristol £210

TILBURY.—For building heating chamber and builders' work in connexion with heating Tilbury Council school (girls and infants), for the Essex Education Committee. Mr. Christopher M. Shiner, A.R.I.B.A., architect and surveyor, 10, John-street, Adelphi, London, W.C., and at Grays and Stanford-le-Hope:—

J. J. Lawrence	£187 15	Brown Bros.	£122 0
H. J. Carter	142 0	G. Brown	87 10

TILBURY.—For heating Tilbury Council schools (girls and infants), Pulsil system, for the Essex Education Committee. Mr. Christopher M. Shiner, A.R.I.B.A., architect, 10, John-street, Adelphi, W.C., and the Gate House, Grays, Essex:—

Werner, Pfleiderer, & Co.‡ £290

‡ Recommended for acceptance.

WETTON.—For alterations and additions to "Swainsley," Wetton, near Ashbourne, exclusive of heating, electric lighting, decoration, domestic hot-water supply, etc., for Capt. Gaunt, R.N. Messrs. W. Sugden & Son, architects, Leek. Quantities by the architects:—

J. Heath & Sons	£/50 0 0	T. Moss, Waterhouse, near Ashbourne*	£599 10 0
W. Smith & Son	695 10 6		
J. E. Wilson	693 3 6		
E. Riley	689 10 0		

WORSBOROUGH (Yorks).—For constructing a new sewer from Church-lane, Worsborough, to Excelsior-terrace, Birdwell, for the Urban District Council. Mr. J. Whitaker, Surveyor, Saville House, Worsborough Bridge:—

W. Guest	£825 0 0	A. W. Macdonald, Park-road-chambers, Nottingham*	£510 0 0
R. Unwin	790 0 0		
Barrick	642 8 10		
Porter & Son	630 0 0		
M. Rucklege	601 14 6		

WREXHAM.—For construction of an approach road to Gresford New Cemetery, for the Rural District Council. Mr. J. Price Evans, Engineer, Argyle-chambers, Wrexham:—

J. Walton	£244 15	J. Johnson	£58 0
T. H. Davies	179 10	R. Rowley, Gresford*	54 0

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